October 1973

Smithsonian

From Samoa to the city:
Talamoi is about to leave
for New Zealand (p. 36)

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October 1973

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Volume 4, Number 7

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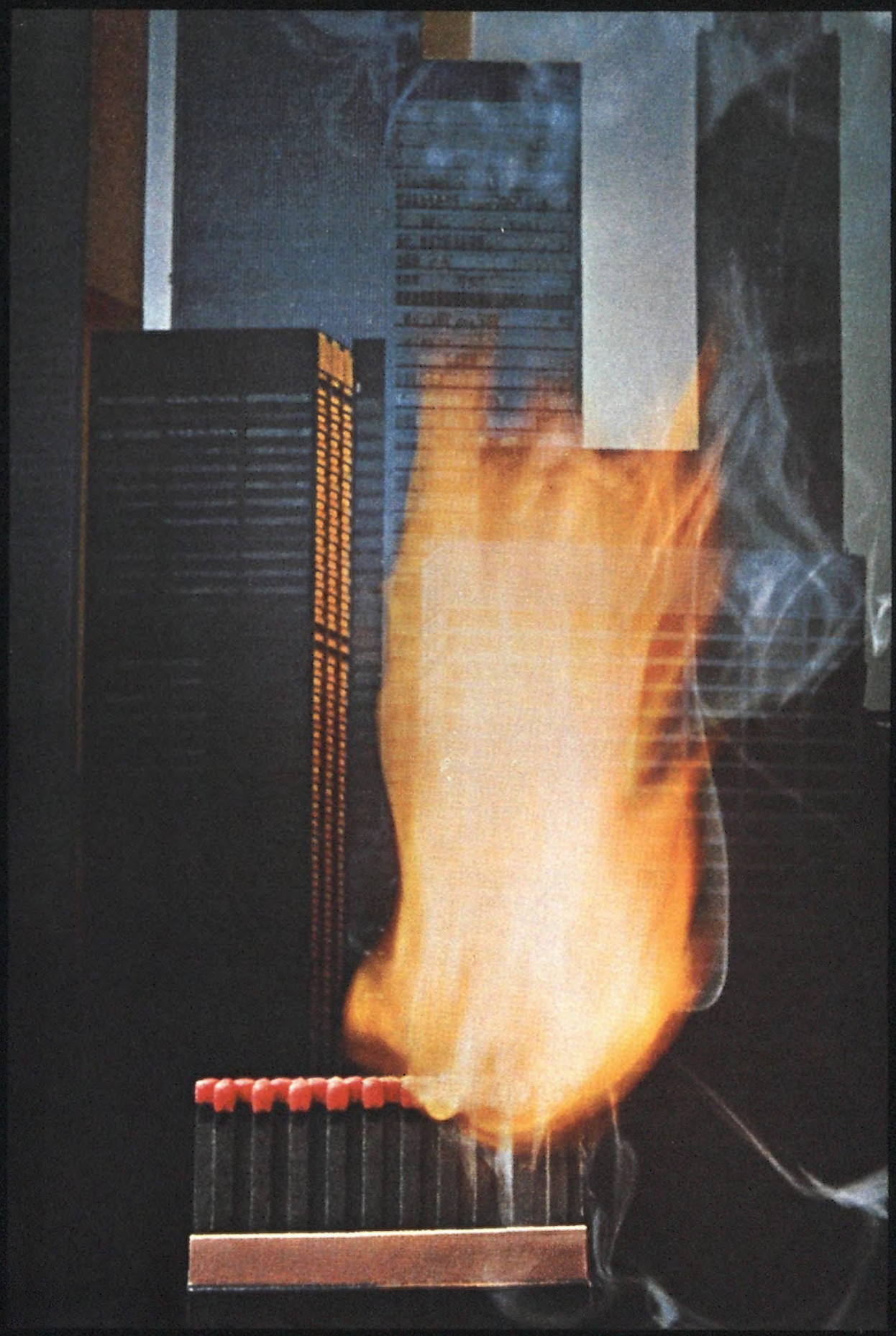
Did you know there's an electronic system that can save lives in a burning building?



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Secretary Ripley's comments

The view from the castle

As the Bicentennial year approaches, let us ask what we can do, each in his own way, to help the Institution fulfill its obligations

By 1976, the year of renewal, the Bicentennial of American independence, we will have been planning for five years what the Smithsonian Institution can do for the American people to mark the event. Meanwhile, is there anything Americans can do for the Smithsonian? Nearly 50 years ago, in 1926, the Institution laid plans for the creation of a membership society to "befriend" it (see SMITHSONIAN, June 1970), but the Secretary at that time, Charles D. Walcott, died before the plan could be perfected.

In the summer of our nation's Bicentennial, three years from now, the Smithsonian expects to welcome more than 30 million visitors to the Mall. For those who can't come to Washington we plan to have a network of traveling exhibits and folklife programs in all 50 states. But I wonder if there are not friends and associates of the Institution, as there were in 1926, who will help us celebrate this 200th anniversary in their own personal and special way.

In 1926 the Institution sought funds to add to its modest endowments, noting that "although well-known all over the world by its valued publications, it had been, if anything, overmodest, and while colleges, private and state, keep their image before the public . . . the Smithsonian Institution has had no similar opportunity to present to the public its achievements and its needs."

In 1976, 50 years later, we will be working hard with government agencies here in Washington—especially the National Park Service—to provide a three-month-long festival on the Mall: music, dancing, pageantry, craftsmen pursuing almost forgotten trades and present-day technicians employing skills without which our complex society would soon break down. Since our country is an amalgam of every other nation, we have invited foreign governments to participate and they have generously responded. The transplanted roots that have taken hold over here will be proudly remembered, and there will be celebrations among the enclaves of citizens originally from other lands, recalling Old World ways that helped make the New World what it is. Also, our new National Air and Space Museum building will open that year.

Although the Smithsonian's collections of historical objects are immense, we lack things dating from our Republic's founding year. The desk that Jefferson used when he drafted the Declaration of Independence—yes we have that, thanks to the Coolidge family of Boston; and we have Washington's uniform and campaign tent. But there were uncounted thousands of other people who, publicly and privately, took part in the growth of our Republic. We intend to issue a call here and abroad for portraits of notable Americans, memorabilia and materials relating to our development.

We seek aid in delineating the record of our American "know-how," our knack of creating ways to get things done. People are eager to look at significant objects, to savor their meaning and come away with the sense of having brushed against history.

There will be no world's fair in 1976, but there will be the greatest influx of people of all time to Washington in that year, and in that sense we will have our own fair. And so we ask you, our myriad friends: Do you have any precious memorabilia that can make the past come to life? If you have, we invite you to share them with your fellow Americans.

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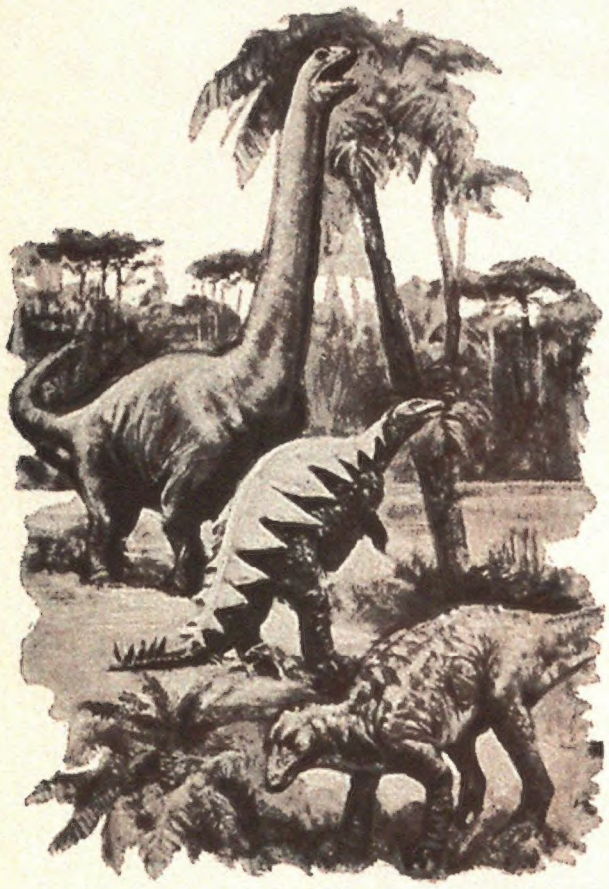

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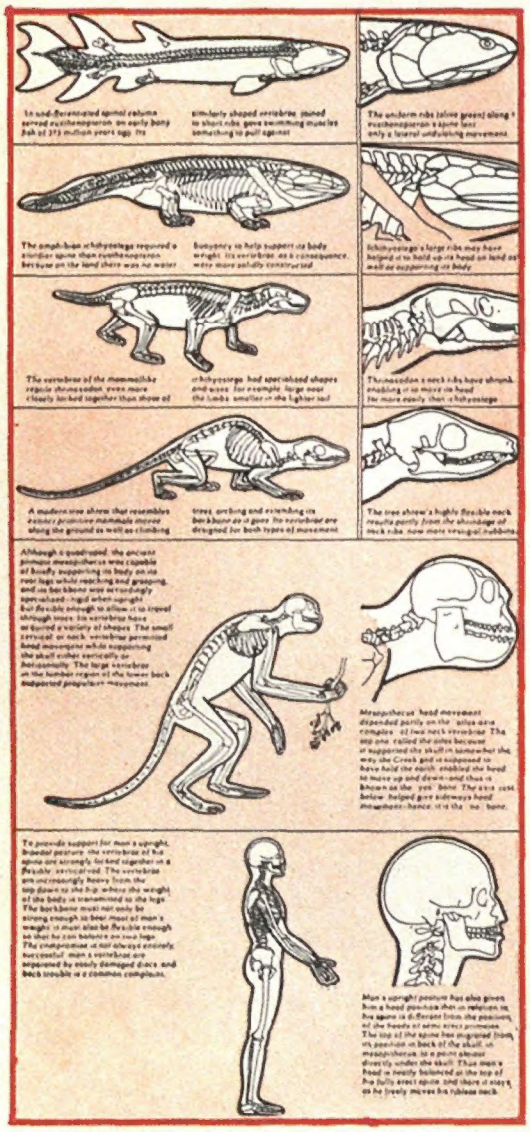

Color-keyed charts like this make the evolutionary processes easy to understand.

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200 years ago this month

Streetlamps are coming to Boston, also a cargo of tea

This new column will turn the calendar back two centuries and each month place the reader within the dramatic events preceding our American Revolution. Compiled from a number of sources, the series will lead up to our Bicentennial.

OCTOBER 1773

Around Boston, the countryside is aflame with fall color. Brilliant reds and golds touch the wooded hills of Milton and Roxbury and the ridges out at Concord. On clear, crisp days, distant steeples seem close at hand.

Colonial roads have improved, and people can travel overland from town to town more easily than a decade ago—though the journey still involves mud and dust and greasy country taverns, where the bugs are rapacious and only the taproom rum is palatable.

In Boston there are many newly paved streets, now being kept scrupulously clean by edict of the city fathers. And street lighting with whale-oil lamps, which has been brightening Philadelphia for six years, is at last on the way. Bostonians agreed to be taxed for it last March.

This is a local tax. It has nothing in common with the duties concocted by the late "Champagne Charlie" Townshend, chancellor of the exchequer in London. All have been removed except a modest tax on tea, but, as a matter of principle, that last remaining Townshend tax has given Samuel Adams, Boston's vociferous, pestiferous militant, fresh ammunition. So, too, has London's latest move—the granting of a tea monopoly to the faltering British East India Company. Monopoly is a frightening word to colonists who depend on open trade.

Under the British plan, the East India Company can now sell tea directly to Americans at a price which at least competes with that of smuggled tea, yet still includes the despised tax. Sam Adams is growing shriller every day over the prospect, and the slightly disreputable Sons of Liberty are holding rowdy meetings and denouncing Thomas Hutchinson, the royal governor of Massachusetts, who has managed to wangle for his two sons, connections and friends, financially enviable positions as consignees of the tea.

Boston's decent people exchange worried views of the situation along with their customary courtesies as they meet at church. And along the dingy waterfront, with its drunks and bawds and robber gangs, wharf rats and seamen dodge the warehouse drays and swear and shiver in their rags when the October rains sweep in on a cold east wind.

Boston has had more than its share of violence almost since the French wars ended, back in the Sixties. For a century and a half a great many people here have had a hardscrabble life, and to be plagued with London's demands, just when the French threat is over and prosperity around the corner, seems too much to bear. There was one tax after another to help defray the war costs; then the King's soldiers arrived, supposedly to "protect" but actually to take up room despite the housing shortage, to get in the way, to quarrel with the townsmen. The city's temper is short.

In other colonial centers people are watching Boston. The New England mood is carried to New York and Philadelphia by hard-riding messengers. One of them is a metalsmith named Paul

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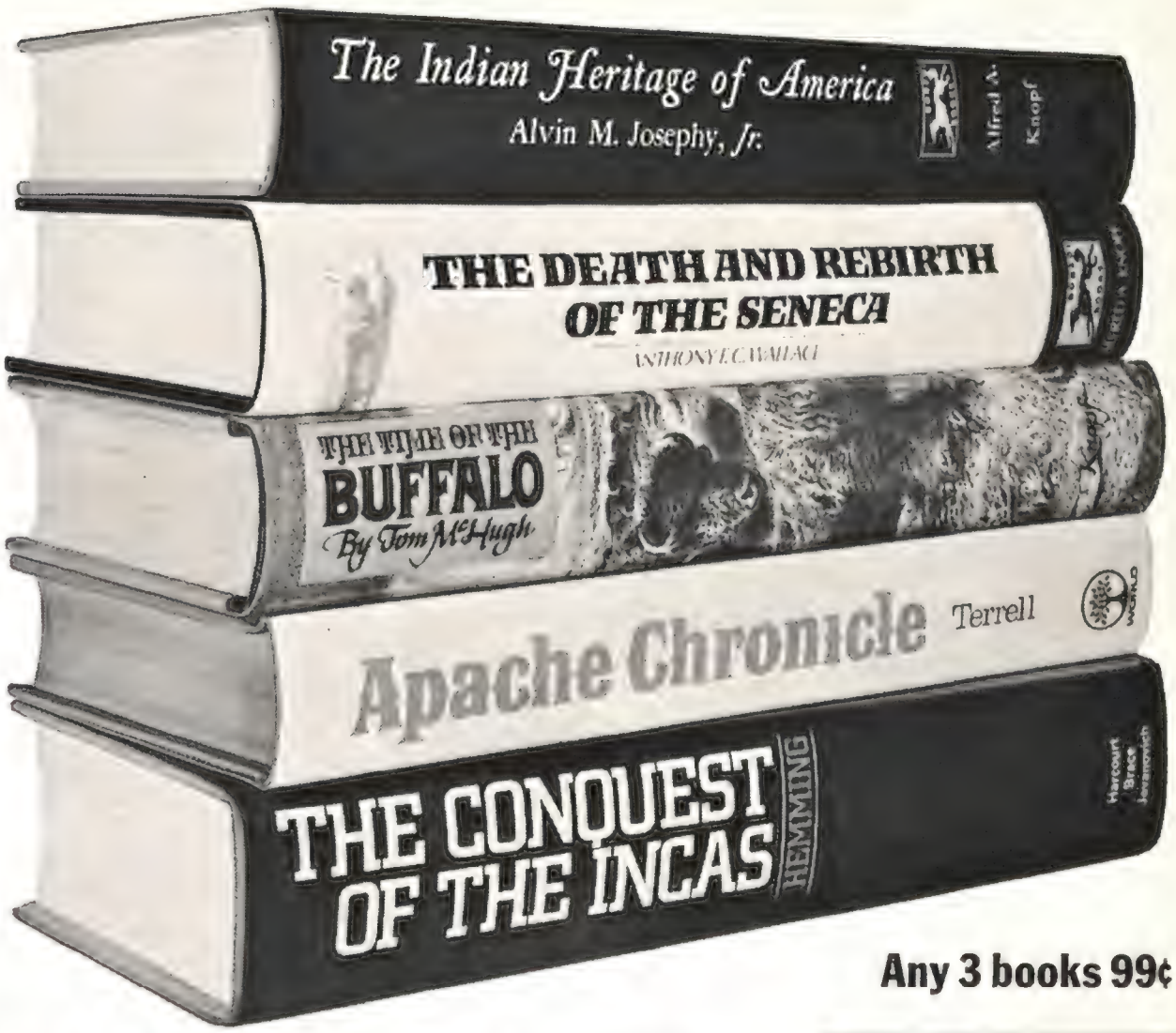

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200 years ago this month

Revere, who takes time out this month to marry Rachel Walker, his second wife.

In Charleston and in Virginia, the northern problems are dulled by distance and time. One Virginian who is deeply concerned is Thomas Jefferson of the House of Burgesses. But he is engaged in private affairs right now, for his father-in-law died last May, leaving much land and also a sizable debt. Jefferson is selling some of the former to settle the latter. His brother-in-law and beloved friend, Dabney Carr, has also recently died, and Tom's widowed sister Martha and her six

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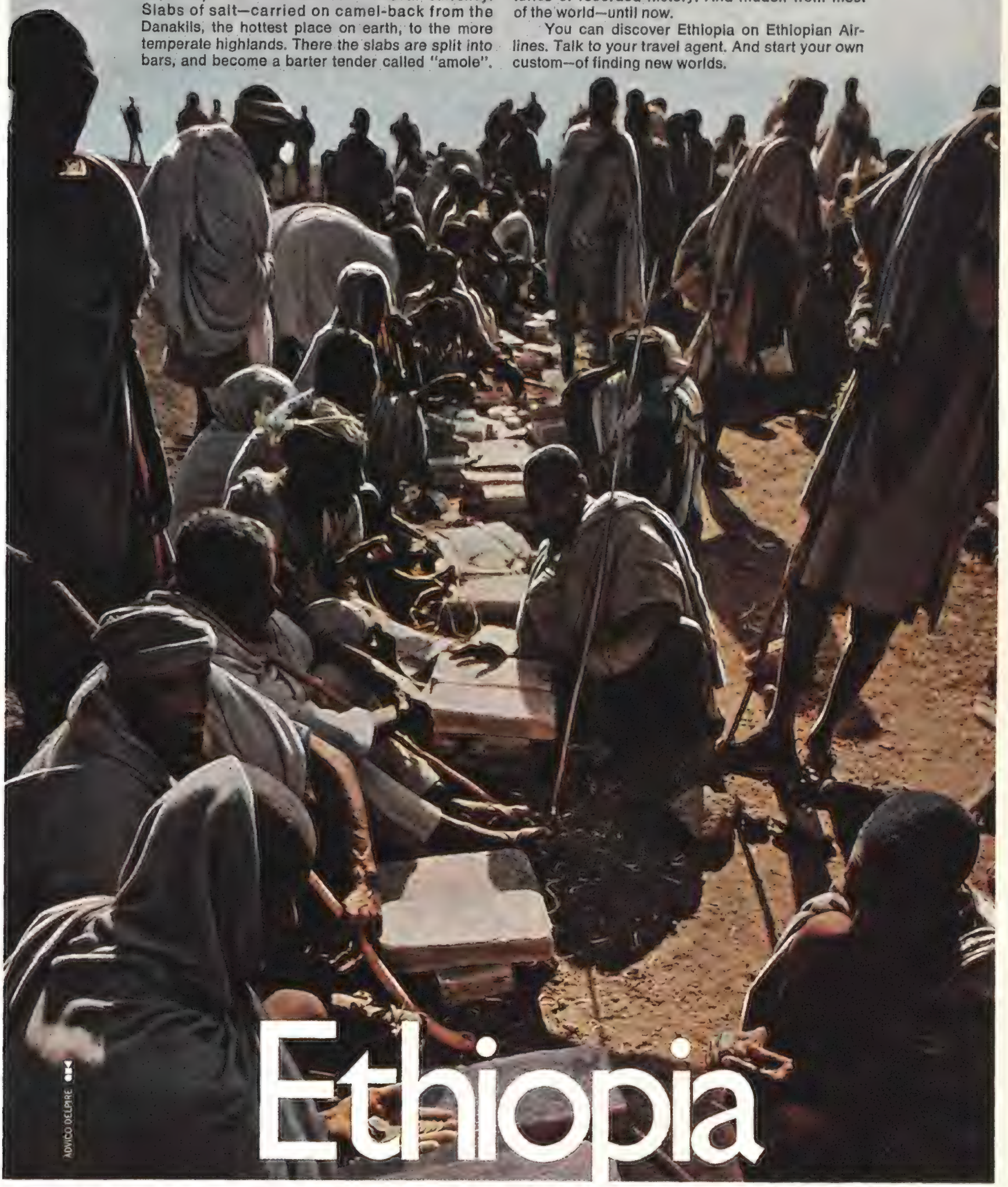

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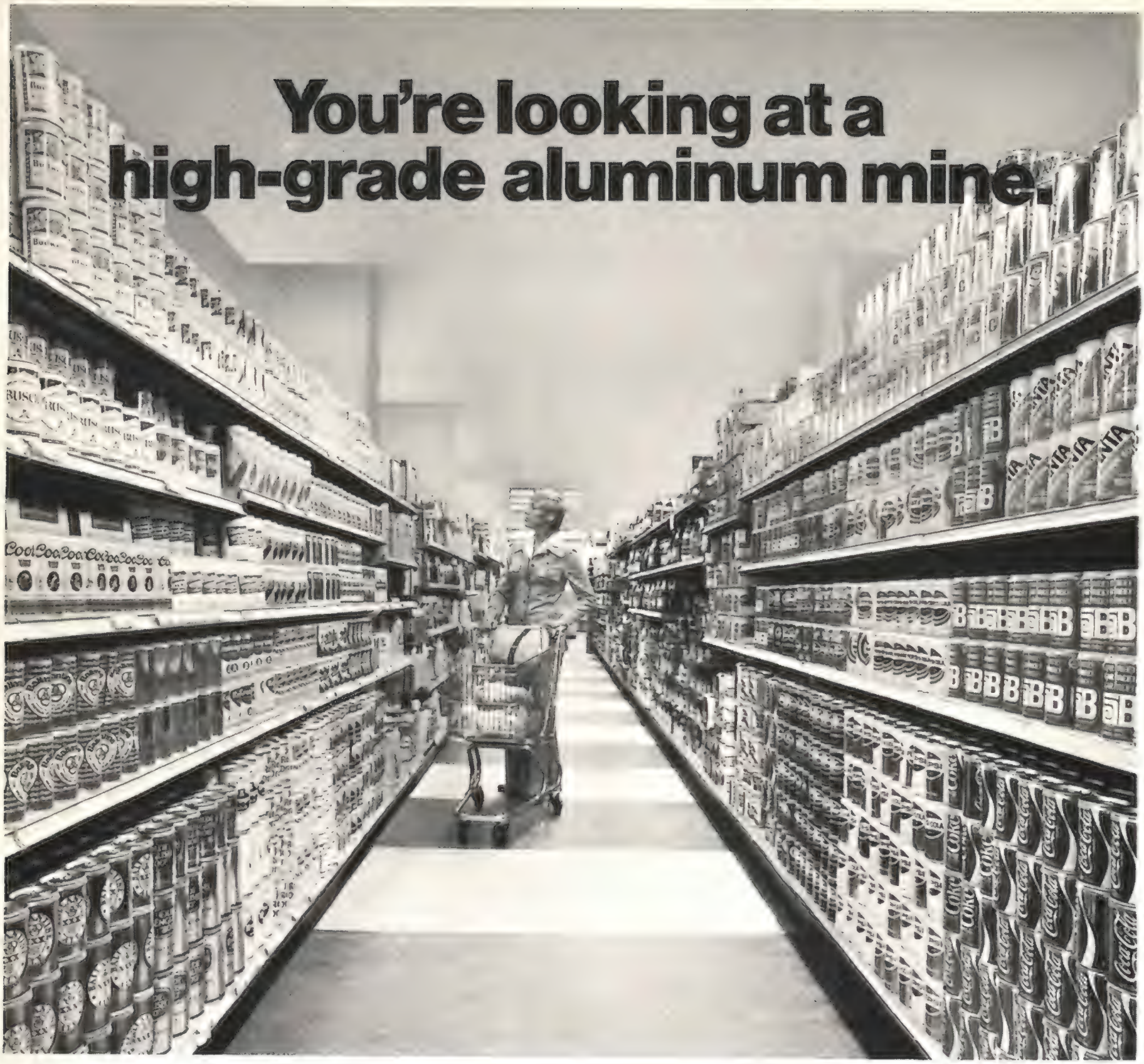

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ALCOA

200 years ago this month

children have come to live at Monticello.

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The Washingtons are just getting over the sudden death of Patsy, Martha's daughter by her previous marriage, who had never been well. And across the Atlantic, King George III is also getting used to a change in his royal family, for this year of 1773 has seen it increased for the ninth time. Prince Augustus, Duke of Sussex, is ten months old and teething.

The King is hardly aware of it, but on the nearby Thames vessels bound for America slip downstream, one carrying the ironwork for Boston's streetlamps. The rest of the cargoes are chests of tea.

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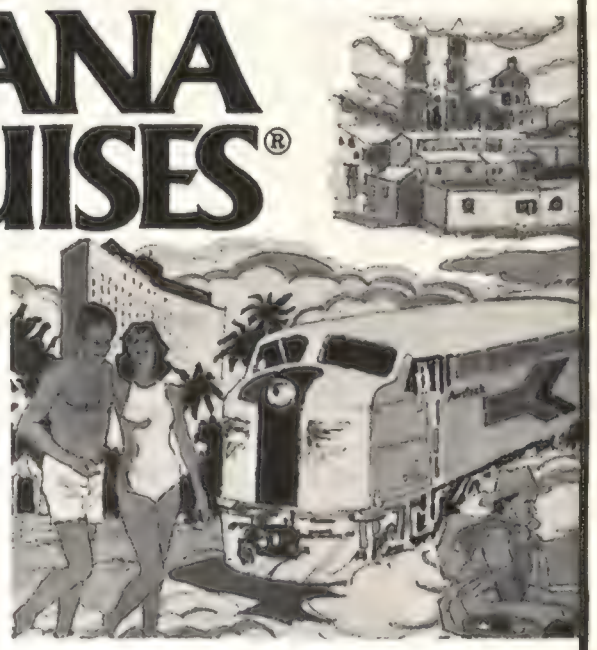

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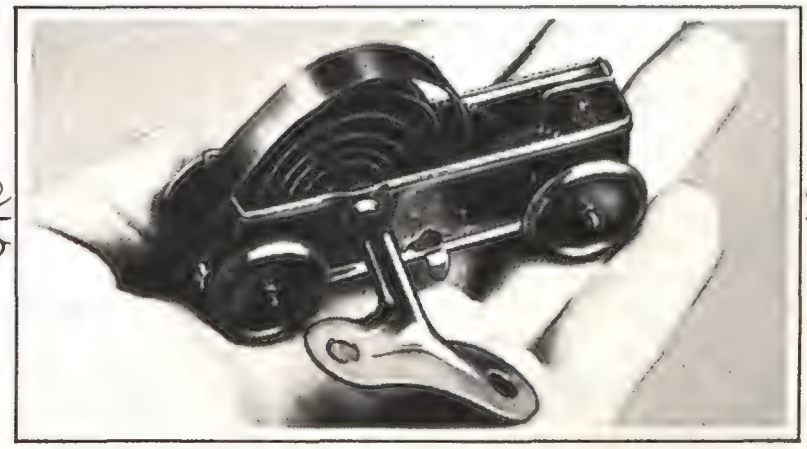

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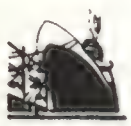

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Phenomena, comment and notes

On drinking less coffee and reused water, sneezing without risk and solving a big antler problem

Until recently, the roughly 13-foot-wide antlers of the long-extinct Irish elk (below) have been a minor embarrassment for evolutionary biologists. What advantage could there possibly have been in evolving such unwieldy appendages? It was assumed that the antlers grew large simply as a natural concomitant of the body growing large, and great body size was a common evolutionary strategem among many mammals of the Pleistocene. But still, reasoned Harvard's Stephen Jay Gould, theory would be better served if some advantage to huge antlers could be found. Certainly, he wrote in *Nature,* they are poorly designed for use in combat, but there still is another possibility.

It seems that, in the deer family (and the Irish "elk" was really a giant deer), antlers often function as status symbols by which rank is established. Yet deer with palmate antlers have to turn their heads from side to side to show off the full display to rivals in front of them. And if the Irish elk had swung "its 85-pound antlers about its 5-pound skull, the resultant torque would have posed a mechanical problem." In other words, the Irish elk would probably have wrung its own neck. Happily for all concerned, the Irish elk is unique among all deer with palmate antlers, extinct and otherwise; the full palm was visible when the animal looked directly forward. Case closed.

A homely cure for oil spills

Seeking the technology to clean up oil spills has been largely a story of frustration; with some techniques the cure has been almost as untoward as the illness. The ultimate answer may have been found in a lagoon near Boston. Writing in *Science,* J. Fred Oesterling and Leo A. Spano of the U.S. Army Natick Laboratories in Massachusetts, announce that wastepaper could do the job.

You take newspaper, cardboard or various other kinds of wastepaper, and "fiberize" it into pieces 2 millimeters long by .05 millimeters wide (or smaller). Document-shredders, well-known in another connection these days, may be used and the resulting confetti spread over the oil. The paper will soak up oil "in excess of

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Caution on drinking water

In a modern science-fiction classic, *Dune,* Frank Herbert described a planet so dry that every drop of moisture including perspiration was reclaimed and purified for slaking the thirst of the inhabitants. While planet Earth is by no means in such straits, the technology exists to convert waste water into drinking water.

Such cities as Denver and Tel Aviv are preparing to install such equipment and the citizens of Windhoek, South-West Africa, are presently drinking what used to be effluent. But two Israeli scientists, Hillel I. Shuval and Nachman Gruener, writing in *Environmental Science and Technology,* have a warning. The adequacy of Windhoek's treatment "has been justified by comparing the effluent quality with drinking water standards," which is fine if the standards are adequate. The two Israelis suggest that most such standards are not adequate.

The U.S. Public Health Service lists 20 "chemical parameters" in its Drinking Water Standards and these include only a few of the synthetic organic and inorganic compounds that can and usually do find their way into industrial waste water. (The USSR standards include some 300 parameters.)

A great deal more needs to be learned, they say, about the toxicity of these substances before waste water is used for human consumption. And even without the added problems of using waste water, the two scientists believe that conventional standards, which are based on the assumption that drinking water will come from relatively pure ground and surface water, are obsolete in any case.

Coffee and the heart

The Roman writer, Terence, must have been right about moderation; the list of things one can enjoy to excess without danger grows shorter every year. Heavy coffee drinking (about five cups a day) has been implicated at least circumstantially in heart disease—specifically myocardial infarction—by researchers at the Boston University Medical Center. Whatever the link, it is not the caffeine, they say, since heavy tea drinking seems to be harmless in this regard. There is a good deal of scientific quarreling on the subject, however, and until the matter is settled one way or the other, one should proceed, as always, at one's own risk.

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The $100 Liberty Bank Note, as a prime example, dates to 1854. It was issued by the Liberty Bank of Providence, chartered by the State of Rhode Island. The engraving was done by Benjamin Tanner from a painting by John Francis Renault. It bears a superb engraving of Cornwallis surrendering to Washington at Yorktown in 1781.

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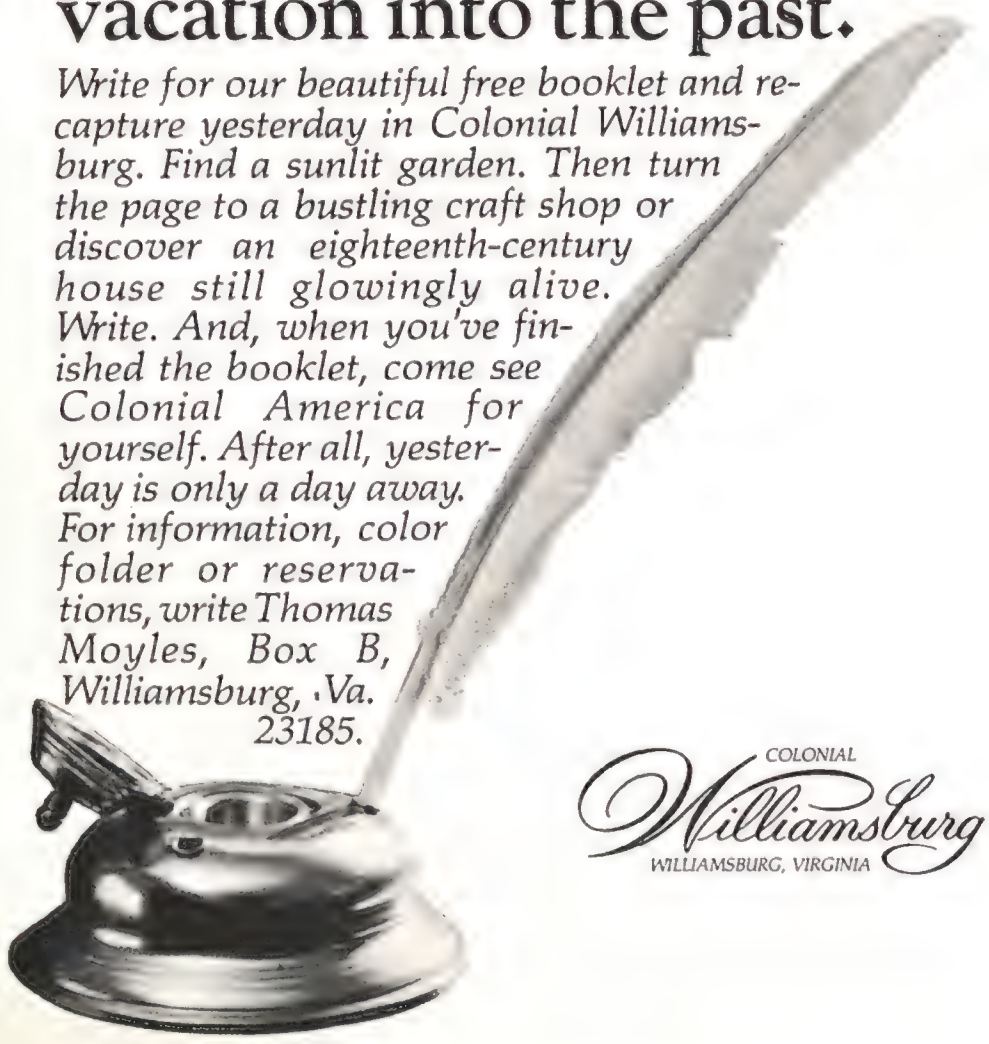

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growing numbers of Manx shearwaters off the New England coast in recent years. Attractive relatives of petrels and albatrosses, these birds are "great oceanic wanderers" but "they normally return to Europe to nest," the Center reports. During the last summer, the Massachusetts Audubon Society found a pair nesting on Penikese, a diminuitive island in Buzzards Bay visited almost exclusively by gulls and a few sailboats. Not only was this the first recorded nesting of the Manx shearwater on the North American continent, but the single egg seen in the nest has since hatched.

On sneezing

Never mind, says *New Scientist,* if someone sneezes on you; you probably won't catch that rude person's cold. But don't shake hands with him even if, for some reason, you feel you should.

A team of researchers at the University of Virginia have been studying the rhinovirus which causes "about one-third or more of common colds in adults." In this connection rhino refers to nose, not rhinoceros, and the rhinovirus lives mainly in the wet membranes of the human nose. It also does well for a few hours on dry surfaces like wood, but it is rarely found in saliva, of which, we are told, most sneezes consist.

The Virginians also observed that people have the habit of touching their noses and eyes a great deal. So the nose-finger-finger-nose route (or that same route with a dry surface interpolated between fingers) might be the main infection route for at least a third of the colds you catch.

Seventy million more years of clams

Paleontologists have found the world's oldest clam. It was previously imagined by those concerned with such affairs that clams had been on Earth for some 495 million years, using that time to evolve unobtrusively into the more than 20,000 species living today. But now, with the discovery of *Fordilla troyensis,* another 70 million years is added to clam history. The fossil, only a quarter-inch long, died in what is now Schodack Landing, New York, but the paleontologists found it right in the Smithsonian's National Museum of Natural History where it had languished some 75 years, a bivalve mistaken for a crustacean.

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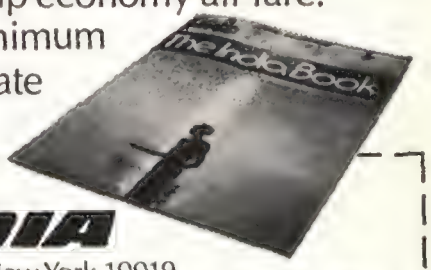

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Letters to the Editor

Corn

Dear Sir: Even though corn may be a "perfect plant" and civilizations have been built upon it as Alan Linn wrote in the August issue, corn is not the perfect food for man. In her new book, *A Plague of Corn: the Social History of Pellagra,* Dr. Daphne Roe, a Cornell University associate professor of nutrition, explains the relationship of corn to pellagra which developed among the poorest peasants of the corn-growing areas of Europe and sharecroppers of the Southern United States. Their diet consisted mainly of corn which is deficient in niacin.

Pellagra did not occur in Mexico and Central America because the Indians from ancient times soaked the corn in limewater overnight to soften it before grinding. Nutritionists have discovered that lime treatment releases enough niacin from a chemically bound form to prevent pellagra. Also, beans were and are a staple of the diet, providing complementary nutrients.

Peggy Champlin
Los Angeles, California

It is true that corn is deficient in niacin and an unvaried diet of it may lead to pellagra. But, as the article pointed out, by 5000 B.C. *when the Tehuacanos first planted corn they were also growing water-bottle gourds, squash, beans, pepper and amaranth.* Ed.

Dear Sir: Wake up, men! The attitude underlying your quotation of the Zuñi Indian proverb, "Love and cherish your corn, as you love and cherish your women," should not be encouraged by affirmative quotation. Are all your readers men? And are "your women" yours in the same sense as "your corn?"

Alice D. Fay
Greenville, South Carolina

Miss Fay's letter and others in this column are evidence that our readership is hardly all male. The editorial staff is divided evenly between women and men, but, so far, there isn't a Zuñi editor. Ed.

Dear Sir: It came as a shock to me to read that Cape Cod is only 1,500 miles from Mexico's Yucatán peninsula. Didn't you lop off 500 miles?

Charles H. Todd
Seattle, Washington

Not quite. The correct distance is 1,800 miles as the jet flies. Ed.

Roman holidays

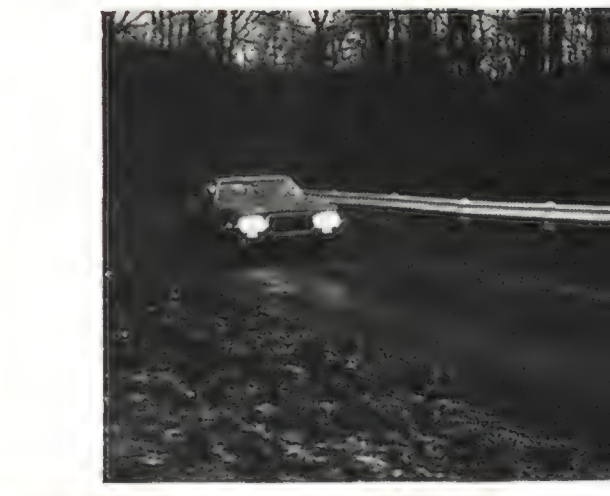
Dear Sir: What is most striking about your article on ancient Roman holidays is that the rich in Italy haven't changed their life-styles in all these years. They still have their villas, parties and visiting friends, far from the masses. Perhaps the major difference is that now the masses are also on the road every weekend and holiday.

As a Greek studying in Rome, I have also observed the lingering Greek influence in the south after centuries of Roman domination. The contrast between early Greek and later Roman communities is nowhere more fascinating than at Cumae, near Pozzuoli west of Naples. Here a Greek colony was founded nearly eight centuries before Christ. The sculptured caves and ritual baths of these earliest settlers are very impressive and the ornate porticoes of later Roman villas show the divergent tastes very well. There are also isolated mountain villages in the far south where Greek is still spoken.

Nikos Mamalis
Rome, Italy

Phenomena, comment and notes

Dear Sir: We have become hosts to a pair of jays (in the wild) that are equally as clever as the laboratory tool-using ones you wrote about. We have often seen ours pick up a bit of cracker or a nut and, after digging a hole to put it in, cover it with a leaf. They remembered where it was hidden and would later take it away. But the most fascinating event occurred



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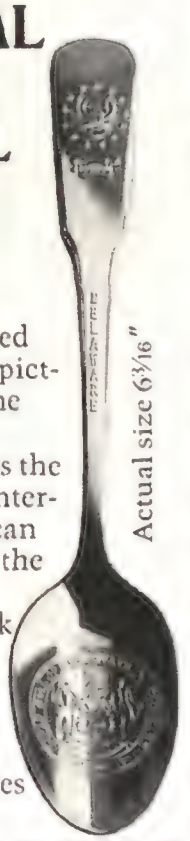

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when one of them was having trouble digging a nut out of the dichondra. It flew away and returned with a large twig in its beak and, using its claws and the twig, finally worked the nut loose and flew away with it in triumph.
Frank Muller
Bakersfield, California

Dear Sir: We have jays here that even surpass your laboratory blue jays. In our yard, they love the hazelnut trees and pick the nuts which grow in clusters of three. They fly to our roof, often as early as 5:30 A.M., and pound the nuts until they can extract them from the husks. These they carry in their beaks, hard shell intact, and put them in the ground almost any place.

A year later sprouts come up and the jays yank until they pull out the nuts—now split in two—and eat them.
Jane S. Elting
Seattle, Washington

Dear Sir: Last winter, my husband watched a scrub jay fly to the top of one of our redwood bannisters covered with ice and snow and then slide down; time after time, it would fly to the top of its play equipment and repeat its ride. Here it was innovating play activity, though not work activity—using a facility, not a tool.
Mrs. Ralph D. Goodrich jr.
Castle Rock, Colorado

Dear Sir: Let me offer an explanation for why the 900 of 1,474 European portraits studied by the Cambridge scientists show a preference for the left cheek. Most artists are right-handed and it's more natural and/or habitual to draw from left to right. It's also easier to see the tip of the paintbrush.
Marjorie Young
Director, Civic Art Center
Battle Creek, Michigan

Dear Sir: Your item about the eastern cougar being placed on the Interior Department's endangered species list reminded me of an article in the *Kansas City Star* in February 1972, reporting an official sighting of a cougar *(Felis concolor)* by a party which included members from the Missouri Department of Conservation.

The big cat was sighted 100 miles west of the Mississippi River near Van Buren, Missouri. This cat species had not been

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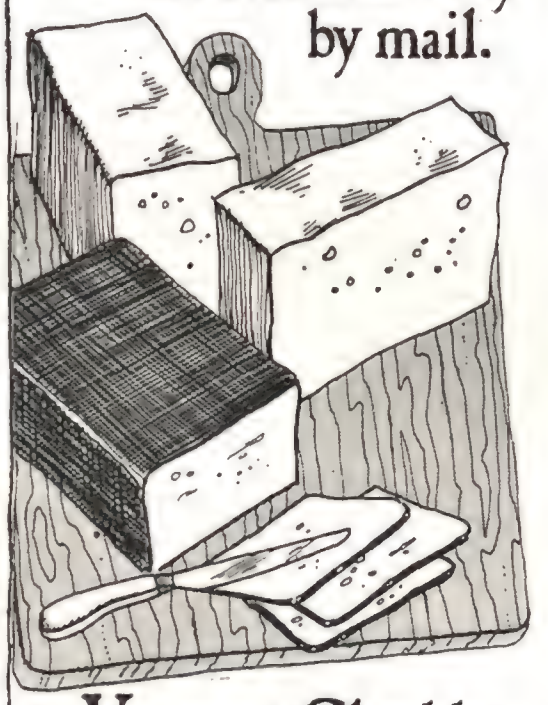

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seen for about 45 years in this part of the nation prior to this sighting. For this species to be sighted in the middle of the country would mean that it has had some population in the area all along for sustained reproduction.

Carl R. Mappes
Zoologist
Columbia, Missouri

The Interior Department is surveying all species of cougar to determine which should be listed as endangered. (Also see p. 51 of this issue.) Ed.

Patrick Ryan

Dear Sir: Patrick Ryan's advice in his article, "Spare the rod and spoil the muse," were most helpful. I have a six-month-old son, and, of course, I am trying to develop his creative abilities. You may have some useful suggestions.

Naturally, I beat him regularly, and feed him as little as possible. Would it be better to leave him in a second-rate day-care center, get a cruel sitter, or leave him totally alone? Should I encourage the cat's dislike of him?

Most disheartening of all, I have been unable to find him a job.

Dana Mochel
Chapel Hill, North Carolina

Dear Sir: Since Mr. Ryan writes quite well, I assume that he was beleaguered by eccentric aunts and spent his childhood in a boot-polish factory.

Rollin Stanford
Durango, Colorado

Dear Sir: I submit that a happy, constructive childhood is more productive than a negative one, and if Mr. Ryan doesn't agree, my suggestion is: Let him start starving so that *he* might start producing better literary fare.

Amy Huelex
Santa Monica, California

Dear Sir: In his otherwise fine article, Patrick Ryan quotes W. C. Fields as saying, "anyone who hates dogs and children can't be all bad." This was said by Leo Rosten in 1938 at a Friars Club banquet honoring Fields.

Ronald C. Semone
Washington, D.C.

Mr. Rosten agrees, even though he says his remark "was uttered in an almost total daze." Ed.

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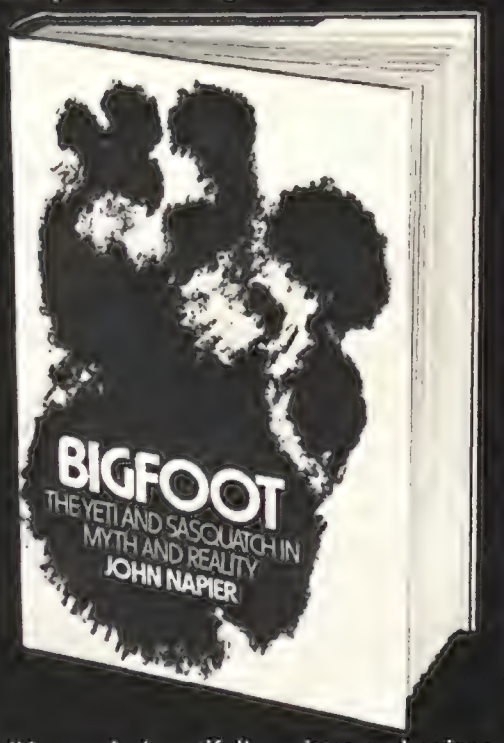

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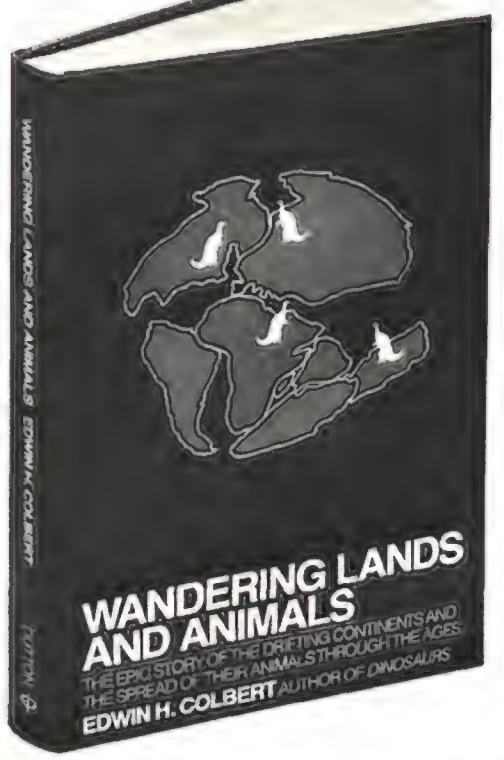
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By Jane Stein

There are ways to help buildings conserve energy

Architects, builders and planners could put their heads together and practice ways to halt the escalating power drain

A man—say he is a city official—sits in his office, the late afternoon sun beaming through the glass wall and flooding his desk with light. Electric bulbs burn overhead and cool air whispers from a metal duct as the man worries about fuel shortages, brownouts and the energy crisis. He might do better to contemplate the state of American architecture.

For architecture and the construction industry have a vast influence on energy use. Constructing and operating buildings consumes 7.5 and 50 percent, respectively, of all the electricity produced in the United States. To practice energy conservation in this sector, we do not need to return to caves and candlelight, nor do we need new technologies.

The main problem is that the simple and technologically available ideas for saving energy are meeting tremendous indifference, if not actual resistance. Certainly it is a profound indifference to energy conservation that fosters the construction of buildings such as the 110-story World Trade Center (right) in lower Manhattan with its fantastic array of electrical requirements, the most astounding of which is that the center will require as much electricity per year as the entire city of Schenectady, New York, which is home for 100,000 persons.

How much energy a building needs for heating,

One of the most visible energy hogs is New York's 110-story-high World Trade Center. Every minute five million cubic feet of air are mechanically circulated in its twin towers. Windows don't open.

A thatched roof, which consumes no energy, shades a suq (marketplace) in torrid Rabat, Morocco.

Colorado's Mesa Verde cave dwellings are oriented to catch winter sunlight and shun summer heat.

cooling and lighting depends upon its site, its shape and the materials used. All of us could learn something about the wise use of natural energy by studying the cave dwellings of Mesa Verde in Colorado (above). In the winter when the sun is low in the sky, it shines directly on the adobe brick walls which store the heat during the day and release it during the night. In the summer the sun strikes at the horizontal surfaces—the roofs of wood and grasses act as insulation.

Never more than one-quarter of the cave's inner surfaces are lit in summer; only one-quarter remains shadowed through the winter day. "Buildings today can be organized in much the same way, generating their form from the way the sun moves," says Ralph Knowles, professor of architecture and urban design at the University of Southern California.

If you design with the sun in mind, you can even put an all-glass building in the desert without paying too much of a penalty in energy costs. In Tempe, Arizona, the striking new municipal building (opposite) has glass walls, slanted at a 45-degree angle to reduce the amount of solar heat that can enter the building.

In a less dramatic vein, it is axiomatic that the broad surfaces of the common, slablike high-rise building should face north and south. Fred Dubin, a New York engineer, has calculated that a building uses 29 percent less energy for cooling if the broad sides face north and south. Why is it, asks Dubin, that all sides of a building are often treated as if they were the same? Why not have no windows on the west side, and fewer in the corners? His point is simply that energy use must be factored into building design, and that means starting at the beginning.

"From the very outset of the architectural process energy is used wastefully," says Richard Stein (no relation of the author), a New York architect and a leading advocate of energy conservation. "Our basic structural sciences are in reality based more on practical experience than on a scientific analysis of how materials should be used."

Jane Stein, a free-lance science writer and formerly on the staff of Engineering News-Record, *wrote on coal gasification in* SMITHSONIAN *last February.*

The slanted, self-shading walls of this glass building in Arizona absorb almost no solar heat.

For example, according to the National Building Code, the concrete beams for the standard classroom are designed to carry three times as much weight as they are likely to need for normal use. While a safety factor of three might not seem excessive, Stein points out that design computations use a value for the strength of concrete only about one-third of its actual strength, so that there really is a safety factor of at least nine. There are additional safety margins: Concrete gains strength for years after hardening. In cement production alone, modified design standards could result in energy savings of about 20,000 million kilowatt-hours a year—enough to provide the electric power for three million families for a year.

Aluminum is gaining in popularity as a building material. It has a pleasant sheen, upkeep is simple, and it takes less aluminum to make the skin of an office building than it does to use stainless steel. But aluminum is very expensive to make in terms of energy. The energy savings for just one typical high-rise office building—if steel were used instead of aluminum—would be 1.3 million kilowatt-hours.

It is not just a matter of using energy-expensive materials; how a building material is used has much to do with energy waste. Dense concrete can get as cold as a stone. Lightweight concrete, with air bubbles blown into the mixture, acts as insulation.

Since Lever House (page 32) was built on Manhattan's Park Avenue in 1952, glass-clad buildings have sprung up all across the nation. Most are energy hogs because glass is a notoriously poor insulator. Heat loss could have been cut by half had double-glazing been used (that is, two panes of glass hermetically sealed with an air space between them which acts as an insulator). Heat *gain* can be reduced by using the new reflective metallic glass, which substantially blocks solar heat and light.

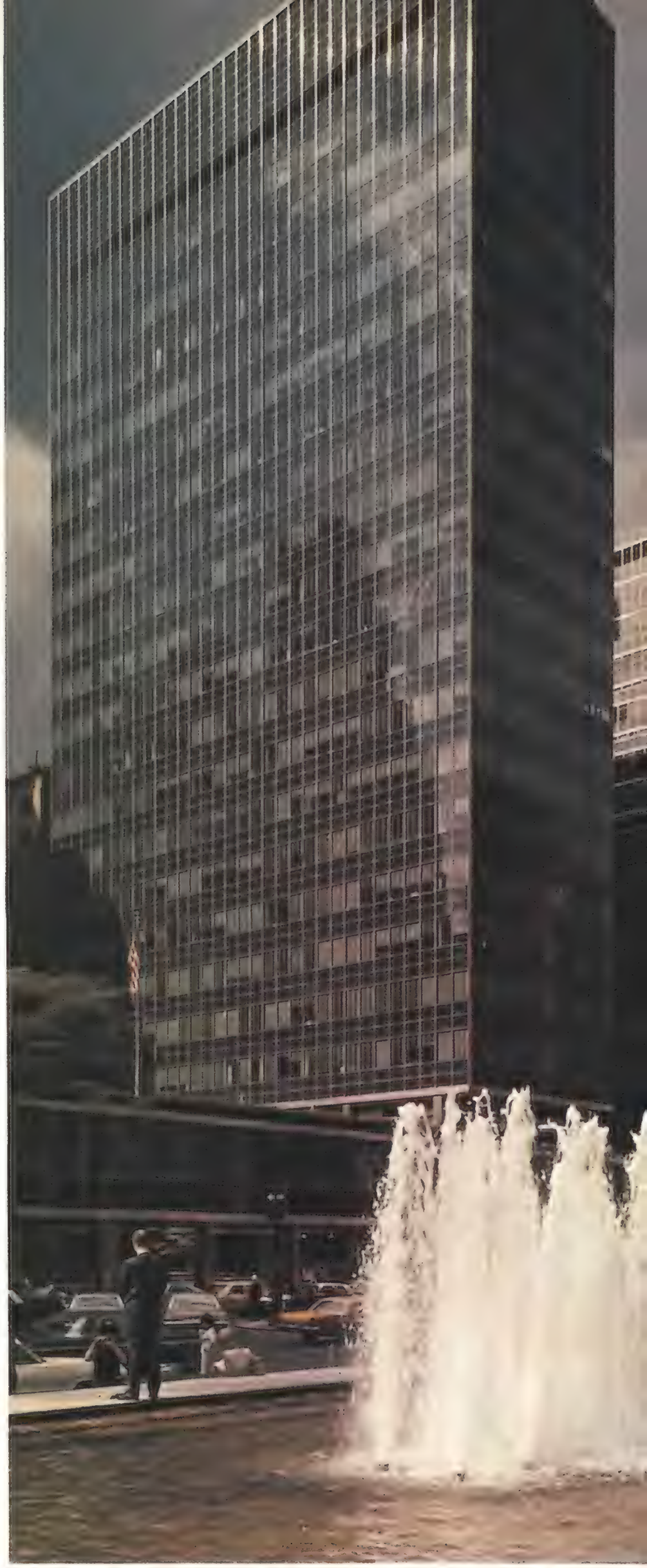
What is true for an office or apartment building is true for a home. A Rand Corporation study says that better insulation in new housing would cut heating and cooling requirements by 40 to 50 percent. Extra construction costs, the report continues, could be recaptured in four to seven years through reduced fuel and utility bills. Over the last two years the Federal

Housing Authority (FHA) revised its insulation standards for single and multifamily housing units, with the stated objective of reducing air pollution and fuel consumption. The FHA standards are merely guidelines to assist appraisers in determining the salable value of a housing unit. Since they are used by appraisers of conventional loan organizations as well as the FHA, they do exert considerable influence on the residential construction industry.

In addition to energy-rich materials and poor insulation, air conditioning and ventilation are extremely important components of wastefulness-through-design. The President's Office of Emergency Preparedness has estimated that, by making fairly simple and obvious changes in the design, 11 percent of the forecasted energy use in 1980 could be saved. Take air conditioning. Richard Stein claims that an average office building is occupied 3,100 hours annually with 500 hours in the temperature range where untreated outdoor air could be used. Simply opening the windows would bring about a 19 percent reduction in the use of energy for handling air—but how many office buildings have windows that can be opened?

Another part of the artificial world which architects have designed for the office worker is perhaps a superabundance of light. In a high-rise building 54 percent of the electrical energy consumed goes into lighting; in a low building this rises to 62 percent.

Consider the high-rise office buildings twinkling through the night with a full array of lights (p. 35) for the cleaning personnel and handful of late-working executives. Selective lighting—lighting up only those rooms or parts of rooms in which someone is at work—would make a less striking skyline but it would save considerably on lighting. Separate switches could be installed so that lights around the perimeters of glass-walled buildings could be used only when nat-



This broad side of Lever House faces south. Many workers close venetian blinds to exclude sun.

A jutting roof line shades windows and grounds at Southeastern Massachusetts Technology Institute.

ural light is insufficient. Other electrical savings include lower-voltage lighting in less occupied areas—hallways, storage areas—or more use of fluorescent lighting, which uses one-quarter as much as ordinary filament bulbs. The overall average lighting levels, many building specialists feel, could be cut in half.

Much extravagant illumination is the fault of lighting standards (used by building codes, boards of education, industries and commercial developers), which have risen sharply and more than doubled in many cases over the past 15 years. Yet there is considerable disagreement as to whether such high illumination at such uniform intensity is necessary or even desirable.

While developing a new building system for school construction in California, architect Ezra Ehrenkrantz sought to develop, among other requirements, low-brightness lighting. Each bidder was required to state the wattage required to perform the job. Bids ranged from 3.3 watts to 6.3 watts per square foot of space to meet the same performance specification. (The system using the least energy, as it turned out, was also the lowest cost.) Ehrenkrantz tallied up some numbers and figured out that a saving in energy for the average California high school of one watt per square foot was equivalent to a teacher's annual salary. "The public," he says,"is not aware of how many teachers are burned up annually with the flick of a switch."

In addition to wasting electricity, lighting produces waste heat which, in most buildings, is then dissipated into the atmosphere. A few architects are now trying to catch this "heat of light" and pass it through conventional ducts and vents to help heat a building.

Making use of wastes, in fact, is the basis of what are now called "total energy systems," in which a building (or a group of buildings) contains its own generating system—usually small gas turbines or fuel cells. Waste heat is not released but reused by converting it into usable heat at little or no additional expenditure of energy. Such systems are costly, however; they require fairly constant demand for waste heat and are still far from perfected.

The resistance to energy-saving stems, in part, from financial institutions. The traditional way of financing buildings is based on first costs—what it actually costs the owner at the time the building is completed. Bank loans are made on the basis of first costs. Low first costs usually mean high energy consumption.

For savings in money and energy, building designs as well as bank loans should be calculated in terms of life costs: what it will cost to build and operate the building over its lifetime. Charles Berg, deputy director of the Engineering Institute for Applied Technology at the National Bureau of Standards, says that "energy conservation methods will obviously come at extra expense, but over the normal expected lifetime of the building, substantial savings in upkeep and energy use could be made."

An example of how these economics can work is seen in the work of Ehrenkrantz. He recently took bids for an air-conditioning system for student housing units, which he based on annual costs over 20 years. He gave the bidders energy requirements based on efficiency factors for the equipment. The cost of additional energy—if the bidders needed it—was to be added to the overall 20-year maintenance costs. The results: better equipment at lower life costs.

The federal government, seeking to break down the first-cost mentality, plans to use life-cost accounting on federal and federally assisted buildings. It is hardly a bandwagon, but interest is catching on. Owens-Corning Fiberglas Corporation has an energy conservation award competition for architects and engineers. Currently, the American Institute of Architects is circulating an exhibition, organized by the design firm of Arnold Saks, showing in photographs "The Architect and the Energy Crisis."

Easy availability of power can no longer be taken for granted and, as energy costs go up, energy conservation will be taken more seriously. Legislators are now predicting that builders will have to inform power companies in detail of their intended energy requirements. Legislation to control the amount of energy per unit of volume may well be with us within a decade. Building codes could be amended to raise insulation standards or to include new provisions for use of glass, ventilation and building orientation to reduce energy requirements. Kilowatt-hours could be taxed, annual kilowatts per building could be rationed.

Such restrictions might inspire architects, engineers and builders to come up with some energy-saving solutions. Energy conservation—if widely practiced—will also stretch our limited resources so that the benefits of energy will be available to more people.

Prefab building units, shown here in scale model, consume less energy during construction.

Manhattan at night is a glorious spectacle, but it may be time to turn off some lights.

TWO

Sitting on a mat in an airy thatched house, Talamoi and her family eat an 11 A.M. breakfast of chicken, taro, breadfruit, bananas, coffee, and bread and butter. Family elders always eat first.

Photographs by Basil Williams

By Keith Cronshaw

Great migration from gentle islands to New Zealand

Polynesians from various Pacific paradises flock to Auckland's 'golden' streets and find the new life has mixed benefits

Talamoi, a quiet, gentle girl from Western Samoa (see cover), has decided to move to a city which, it is rumored, has sidewalks paved with gold. She has lived her 23 years in her village—Puipaa, close to Apia on the island of Upolu—and has been surrounded by scenes of incredible beauty. Her days have drifted by in dreamy succession without planning or routine, but many of her friends have gone to a land across the sea called New Zealand, to Auckland (pronounced "Oakland"). Within Talamoi there is growing restlessness.

Increasingly, her thoughts dwell on that unseen and unknown land as she looks after her five brothers and three sisters and launders at the village tap, or prepares the breadfruit and fish baked in banana leaves in hot rocks, or propels the ancient sewing machine while an aunt feeds in the cloth. Talamoi's life revolves

In a gleaming, modern kitchen in Auckland, Talamoi helps Moli prepare a quick suburban meal.

Island washday finds Talamoi helping her mother launder with plain soap and cold water.

Washing is easier in Auckland, but hanging out laundry on a cold winter day is hard to bear.

At work in a packaging plant, Talamoi does her job well, but may take years to make friends with *pakehas*.

around children and the Methodist church. Her home, called a *fale,* has a thatched roof, blinds along the sides and a floor of matting.

Sunday is Talamoi's day. She goes to church three times. In an elegant white dress, she sings in the choir and later serves at the weekly feast of village elders. Though the capital city of Apia has more than 30,000 people, there are just five homes in Puipaa. Only marriage brings in a newcomer; traditionally, only death takes someone away. But Talamoi's closest friend, Moli, has been in New Zealand for two years. And now the day has come when Talamoi decides to go there, too—a trip of 1,800 miles.

The new migration

Scientists are still trying to chart the amazing migrations of the ancient Polynesians, covering thousands of square miles of Pacific Ocean. And now Polynesians are on the move again.

Over the last decade Cook Islanders, Western Samoans, Tokelauans, Niueans and other Pacific islanders have flooded into New Zealand in search of higher wages and a better standard of life, possessed by the feeling that time and events have been passing them by. Now there are some 50,000 of these migrants, more than half living in and around Auckland, the nation's largest city. While Pacific islanders moved from island to urban areas, native New Zealanders—the Maoris—also flocked to cities from the countryside. More than half now reside in urban areas, compared with only 10 percent 25 years ago. The influx of Maoris and Pacific islanders make Auckland the largest Polynesian city in the world—and racial troubles are more than possible. However, with Pacific islanders less than 2 percent and Maoris about 8 percent, Polynesians still make up only about 10 percent of New Zealand's 3 million population.

Auckland, proud of its urban image, eager to embrace its millionth soul and hungry for unskilled labor, accepts incoming islanders readily, as do some shark landlords who rent shanties for $50 a week or unlicensed boardinghouse owners who crowd as many as eight migrants into one room. The ways of the *pakeha* (stranger or white man) are abrasive to the newly arrived Pacific islanders.

But still they come. Cook, Niue and Tokelau islanders have no restrictions on entry since they are New Zealand citizens. Half the population of the Cook Islands is now living in New Zealand, many of them sending money to their families back home. They leave by ship and on two flights a week, and eagerly await the inauguration of a jet service that will get more of them to New Zealand faster, sooner.

The Western Samoans, independent of New Zealand

since 1962, enter at the permitted rate of 1,500 a year. These "Irishmen of the Pacific" have a reputation for being proud, pugnacious and trigger-tempered. Between them and the Maoris there is frequent hostility. Violence has increased in Auckland with frightening rapidity in recent years.

New Zealand's National Development Council, which is responsible for advising the government on long-term economic planning, advocates more direct aid in the form of finance and trade to the Pacific islands instead of encouraging more islanders to migrate. It feels that direct assistance would minimize budding social strife, and that New Zealand's population should continue to be boosted by a natural increase, coupled with immigration on a modest rather than large-scale basis.

The Council points to the steadily increasing number of Polynesians pouring into the unskilled work force, at the rate of 2,500 annually. (The roughly 30,000 immigrants per year from Britain and Australia are mostly skilled and semiskilled workers.)

Troubles may lie ahead

There are disproportionately low numbers of Polynesians receiving higher education and disproportionately high numbers going to prison. It seems likely that Auckland will know about racial problems if there is a serious depression.

But the *pakehas* have displayed some foresight: Service clubs have set up trade training schools, pre-employment training classes and language classes, and they've all been eagerly accepted by the islanders. And employers were fast to wake up to some facts of Polynesian life. When a man dies, for example, everyone goes to his funeral because all are brothers. Work can wait. This is the island way and, after the initial culture shock, employers told them to go ahead. Islanders are good workers who give a more than fair day for their wages.

Among the Pacific islanders in New Zealand today there are three groups: a small number of elders, secure in their own island way of life even though they live in an alien culture; a concentration of 18 to 35-year-olds with an island background, yet young enough to be influenced by their workmates and torn between two ways of life; a growing number of youngsters born in New Zealand and desperately trying to achieve a balance between the world of the elders whom they are taught to love and respect and the world of schoolteachers and school life.

Photographer Williams and writer Cronshaw use New Zealand as a base from which to cover South Sea subjects. They are both veterans of Fleet Street.

Talamoi waits for a light before crossing a street—
a strange situation to an island villager.

At home in their villages, young men and women know exactly their places and exactly what their rights and duties are. In New Zealand they are free—and often lost in their unaccustomed freedom. They must also go to work in the factories instead of the fields, and they must be at their new jobs on time. In the islands, a man himself is the master of time. In this new life, time seems to be the master of man.

Talamoi, the gentle girl from Puipaa, has had a secondary education. She was a good student. She has seen tangible evidence in Apia of the unknown land, the land of promise. There are refrigerators, radios, television sets and a profusion of U.N. and foreign-aid people—New Zealand volunteer service personnel, school teachers, advisers, accountants, the Peace Corps. The presence of these people and of consumer goods is all-pervasive. This, along with her pining for absent friends, leads Talamoi to the big decision to board a plane for Auckland.

The Polynesian way is to look after one another, and so Talamoi joins Moli at the home of Anna and Anna's husband, Pat, who is working a night shift as

a welder in an automobile factory. Anna's house is painted green and white and it is spotless. Interior decorations include bright nylon carpets, chocolate-box prints, draperies from a local department store and an encyclopedic set of Bible stories in a plastic, imitation wooden rack for her four children.

The house is in Mangere, an outer suburb of Auckland. It is bare of trees. It is also dotted with churches, all modern and looking like wedding cakes—and all competing for the souls of the island newcomers. Anna has lived here for several years. Back home in Apia, she says, her family ran taxis, a hotel and a plantation.

"I don't know about the rest of them but this Samoan is different," says Anna about herself. She is plump and jolly on the outside, but sometimes a tough defensive look clouds her face. Anna's values are confused and deep within she is not happy. Her sisters have married *pakehas,* she says—hers is the only Samoan marriage.

Anna's neighbor is putting up a fence. After two-and-a-half years they have quarreled because the kids fought over a toy. The neighbors call Anna a black bastard, but this is not really a racial thing, just a result of the tensions and rigidity of suburban living. Anna, though, resents this slur: "She called me a coconut," she keeps repeating. "I was brought up in the *pakeha* way. I wasn't brought up in the Samoan way."

Talamoi observes this with quiet distress. Soon after her arrival Anna takes her job hunting. Over the grapevine they hear there is a job opening in a packaging plant. This plant has Western Samoan workers just as other factories may be manned exclusively by Cook Islanders. Many employers see this as the best way of handling the complex relationships among island immigrants.

Talamoi is in luck. She gets her job and starts work at $50 a week. But when winter comes, it becomes torture for Talamoi to climb aboard a bus in the chilly, early morning and often leave for home at 8 P.M.

And one day her friend Moli tells her she is going to marry, and Talamoi confides that she would like to go back home.

In Western Samoa, Talamoi and her cousin shop at the market in Apia, the island capital.

In New Zealand, Cousin Anna takes her to a suburban department store where wonders never cease.

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Not widely mourned, but threatened nonetheless, the three-inch-high salt-marsh harvest mouse, a victim of landfill and urban development, is found in isolated groups in San Francisco Bay area.

Photographs copyright ©1973 Nina Leen

Photographs by Nina Leen
Article by Victor B. Scheffer

Gallery of U.S. animals in peril grows, but a new wildlife ethic is emerging

Amid portraits of some lesser-known species on the list of the endangered, a biologist celebrates the quiet revolution in attitudes

My father, Theophilus Scheffer, who died in his hundredth year, once told me that he could not be blamed for exterminating the passenger pigeon, because the only time he had a shot at one he missed. The last pigeon died in the Cincinnati Zoo when I was eight years old. Now I am retired from duty as a biologist in the federal government and have had long hours to think about my father, and about the silver-gray pigeon, and about all lost, wild America. Father was born in 1867. He saw the beginnings of the Age of Petroleum, the Age of Electricity and the Age of Nuclear Power. I am alive at the beginning of the Age of Ecology or, if you wish, the Age of Environmental Awareness, or the Age of the New Conservation.

These new beginnings are historic points of acceleration marking the onset of qualitative, as well as quantitative, changes. To be sure, in the century from 1870 to 1970, the population of the United States rose from 40 million to 203 million and the Gross National Product rose from almost $9 billion to nearly $1,000 billion, but such numbers do not reflect the truly important changes—those in human attitudes, moral values and priorities. Father would have said they do not reflect changes in the Spiritual Condition of Man.

Because I have lived through a period of remarkable change and because I am a naturalist, I have set myself the task of tracing the evolution of a new wildlife ethic in North America. The evolution is in fact a quiet revolution. How men will "use" wildlife in the future will be sharply unlike that in the past. Today we see hunters engaged in an ideological war with nonhunters, and trappers with nontrappers. These and similar points of controversy call for examination.

The symbolic animals in the wildlife revolution—the emblems on the banners of the marchers—are the whale, wolf, eagle, falcon and other creatures that breathe deeply the airs of freedom. The city of Duluth has established a Hawk Ridge Nature Reserve where hawks can be seen as they soar cleanly above the waters of Lake Superior. Schoolchildren flood Congressmen with letters demanding that wild horses be protected from "villainous" dog-food makers and "heartless" cattlemen who "want to keep all the grass for their cows."

And to many sensitive Americans, the symbolic animals in the wildlife revolution are the helpless kinds in these photographs by Nina Leen. They now stand with their backs to the wall, unable to defend themselves against new enemies and competitors for which they have no inborn defenses. The little Key deer, no bigger than a dog, is moving deeper and deeper into the swamplands of Florida. There it shares the habitat of the Florida panthers, which have been reduced to a few hundred.

The salt-marsh harvest mouse of San Francisco Bay is dwindling in numbers while bulldozers "reclaim" its territory. The kit fox and the desert bighorn of the arid Southwest are being crowded out by the stockmen, the retirement-home developers, the testers of

Nina Leen traveled the continent to photograph America's threatened species. Her own book on this subject, And Then There Were None, *appears this month, published by Holt, Rinehart and Winston. The text of this article was adapted from the preface of Victor Scheffer's new book,* A Voice for Wildlife, *which will be published early next year by Scribner's.*

Article copyright ©1973 Victor B. Scheffer

military weapons and others for whom the once-forbidding desert is now a promised land.

Is any one of us—scientist, poet or merchant—more diminished than another by the loss of a species? When Darwin wrote about the survival of the fit did he know that Man, the newcomer, would redefine fitness so queerly that few other animals could survive without his consent?

The wildlife revolution began in the ranks of youth, in that wondrous company where one can afford the luxury of ideals and can easily fall in love with the image of what Man could be. Though young people in all times have been skeptical and rebellious, prone to see failure and hypocrisy before accomplishment and truth in the lives of their elders, the generation gap that began to open in the 1960s has now become remarkably wide. I was gently amused, a year ago, when my students in zoology at the University of Washington objected to using ordinary mousetraps to catch small animals for study. And so, instead, we set out a string of live traps and, after watching our captives for a while, released them to scurry away through the sagebrush. A small affair, but thought-provoking.

The young people of today are advancing through analytical or conceptual intelligence to what philosopher Patrick Corbett calls "the kinds of intuitive or imaginative intelligence displayed. . . by cats, mothers and poets."

I would not want to leave the impression that the new look at wildlife conservation is the insight of youth alone, for every generation has had its adults who held the clear, uncluttered vision of youth. I think of Henry David Thoreau, John Burroughs, John Muir, George Bird Grinnell, Theodore Roosevelt, Liberty Hyde Bailey, Aldo Leopold, Olaus Johan Murie and Rachel Carson. They grew in prophetic stature because the words they spoke in their time are increas-

Survival is held promising for the dog-sized Key deer, its increasing numbers (600) protected in Florida.

The San Joaquin kit fox's dry valleys have given way to irrigation and agriculture. Some 3,000 remain.

With a mere 38 to 40 Mississippi sandhill cranes left in the wild, captive breeding is their one hope.

Never abundant, the black-footed ferret has been seen in the wild in only 30 Western counties in 20 years.

Only a few hundred San Francisco garter snakes remain in scattered colonies around local reservoirs.

Vulnerable: The desert bighorn sheep is subject to high lamb mortality, drought and illegal hunting.

Relentlessly hunted, very few green turtles remain in

ingly recognized as truth. Thoreau, jailed for carrying out his ideas, is now a hero of liberal thought.

We must, of course, judge prophets in the context of their time. Beyond the faces of Grinnell and Roosevelt we see dimly the mounted heads of trophy birds and beasts. Though champions of wildlife, those hunting men could never quite see animals apart from pieces in some enormous game. The Boone and Crockett Club, a strong organization today with headquarters in the Carnegie Museum in Pittsburgh, was founded by Roosevelt and others in 1887; its letterhead still reads: For sport with the Rifle and Conservation. We can sympathize more readily with the purpose of the club if we remember that it came into being in a conservation vacuum.

The revolution in wildlife conservation was given respectability in 1972 at a world conference, the full impact of which is yet to be measured. On June 5 to 16, 1972, the U. N. Conference on the Human Environment met at Stockholm, attended by delegates of 113 nations, by accredited observers of about 500 organizations, and by unofficial representatives of about 500 other organizations. Never before had Earthfolk assembled in such numbers to consider the task of Earthkeeping. The newly developing nations were there, not quite sure that they could afford wildlife at the (supposed) expense of economic improvement. The older nations were there, convinced that healthy wildlife populations are an index to a country whose people are living in balance with its natural resources. On the last day, the members accepted a Declaration on the Human Environment which read, in part:

> "Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat which are now gravely imperiled by a combination of adverse factors. Nature conservation including wildlife must therefore receive importance in planning for economic development."

Despite ideological, political, economic and religious differences, the men and women who met at Stockholm were able to agree that "the Earth is a closed ecological system and man continues to modify it only at his peril."

The wildlife crisis is part of a larger environmental crisis which, in turn, is a 20th-century collision between supply and demand—the supply of Earthly resources and the demand of a people growing ever more numerous, more wasteful and more untidy. The crisis was predictable—not the result of some new factor in our world such as losing faith in our gods. What is new is public awareness of the crisis. *Time* magazine identified it on August 1, 1969, when it began to print a new section called "Environment." Other national magazines began to print whole issues or special seg-

U.S. mainland waters but captives have recently bred.

Often taken for a coyote (with which it hybridizes), the red wolf is in peril in Texas and Louisiana.

ments. On Earth Day, the phrase "environmental teach-ins" became part of the English language. By the year 1970, the message was coming clear to all who listen: We can never hope to "get away" from Earth and from ourselves.

All of us see changes in buildings, cities, automobiles, clothing and other trappings of civilization, but few see changes in the living tissue—the biosphere of the world—for these are subtle and obscure. Changes in material culture fluctuate with fashion while changes in the biosphere have a way of becoming deep and final. It was the naturalists, from career scientists to organic gardeners, bird watchers and a great many hunters, who early saw the important changes and who are now so terribly upset at the degradation of wildlife environments.

The bald eagle, the bird that stands for the United States of America, is in trouble. There may be less than 5,000 left in the states, not counting Alaska. The California condor, the largest land bird in America, is down to 50 individuals nesting in one mountain range. About 50 whooping cranes are alive in the wild; another 30-odd live as captives. The grizzly bears of the United States outside Alaska number nearly 1,500 and the wolves are down to 1,000.

The wildlife revolution can be explained as a new awareness, first, *that wildlife populations and their homelands all over the world are going down the drain,* and second, *that killing, whether it be of people in political wars and in electric chairs, or of animals in the wild, can be erosive to the human spirit.* The first awareness is generated in the belief that prior generations failed to conserve "nature," which is to say the world outside of Man; the second is the belief that they failed to protect nature within us, or human nature. The new conservationists believe simply that the sort of violence to land and life of which man is peculiarly capable is wrong because it is counterevolutionary to our species.

In all the world, more than a million species of animals, from microscopic one-celled sparks of life to Man himself, have been named and described. Collectively they represent a mass of two million million tons, of which the bodies of men, women and children contribute one part in 10,000. Though the human fraction is tiny, the interplay between the people and the remainder of the biomass is complex beyond understanding. People and animals *do* things to one another, with the result that people classify animals as good or bad, and their own reactions toward animals as right or wrong.

The late Ernest P. Walker, assistant director of the Smithsonian Institution's National Zoological Park for more than 25 years, would now and again eaves-

drop on visitors at the zoo as they stared at some unfamiliar beast in a cage. "What good is it?" one of them would ask, or "Is it mean?"

The questions are not really vacant; they represent a fumbling effort of the human to understand the animal. The visitor looks at the beast with feelings which range from embarrassment to fear and tries to bring it into focus where he can appreciate it. So he asks the questions that he hopes will be answered, Yes indeed, the beast is good for all of us. No, it is never mean or nasty like people. The visitor cannot see across the ten million years that separate him from his nearest relative in old Africa; he cannot understand that all beasts are amoral.

To be sure, we fall into the habit of labeling creatures like the bobwhite quail as good all of the time, the fox as good most of the time, the starling as bad most of the time, and the vampire bat as bad all of the time. This is not a useful habit. The words, *beneficial* and *injurious* are properly applied, not to species but to populations at a specific time and place. A few beavers in an aspen glade are welcome for the good they do by storing water and by delighting visitors to their ponds; a hundred may be unwelcome for the harm they do by overcutting the wood supply and eroding the stream banks. A few porcupines in an evergreen forest may give pleasure to the traveler; many porcupines mean trouble for the forester, who sees the dying tops of the trees they have fed upon.

I have suggested that my wildlife revolution originated in concerns for both outer and inner nature—for wild animals and for humanity. I find it hard to present a convincing argument for the latter proposition—that the new conservationists are concerned about humanity-through-animals—that they believe the fate of the animal is the same as the fate of man himself. This is an abstraction. Yet I believe that many of us today are taking a deeper look at inner feelings.

We are wonder-struck by the image of our lonely world as seen from eternal space, and we fear that we may lose this tiny ball of beauty through failure to appreciate it. As we launch the first spacecraft to leave the solar system, we fasten upon it a gold-plated message telling in cryptic marks that at least one Man and one Woman survive on the third planet out from Sol. Between the lines of this celestial advertisement is there a note of apprehension? Do we fear that our easy willingness to destroy may leave no sentient being to send a later message to the stars?

In our new self-awareness, we look at the wild animals of Earth and we see them plain—they are blood relations. They have a silent right to consent to what we propose. We are increasingly reluctant to kill them except for our own subsistence or protection.

Put in other words, our new morality deals with the ways that animals should, and should not, be used. At one extreme, a creature is said to be useful if it brings pleasure to those who can never hope to see it in the flesh, yet are satisfied to know that it is out there somewhere in the wild—free, alive, hidden, breathing, continuing its ancestral bloodline. At the other extreme, a creature is said to be put to its highest use when it is converted to meatballs for cat food, or when its cured remains are draped on a human body for the satisfaction of personal vanity. I am convinced not that a particular use of an animal is intrinsically right or wrong, but that some uses fit better than others into the new morality.

I was visited the other day by a group of young people from the University of California who were eager to study the behavior of seals, whales or dolphins. They wanted no part in the ongoing, multimillion-dollar military research upon marine mammals, and they were lukewarm about studying animals in commercial aquariums. I sensed that they were trying to articulate more than a scientific curiosity about wild animals; they were trying to say: *We care.*

Each one of the symbolic animals is adapted to its place and style of life; each moves in perfect accord with nature. We humans may have forgotten how so to move, and yet the animal is in us; wild creatures are other kinds of people; they contain the roots of mankind in the bodies of organisms which have taken another evolutionary course.

"I love forms beyond my own," says the poet-anthropologist Loren Eiseley, "and regret the borders between us."

It formerly stalked throughout the Southeast, but now no more than 300 Florida panthers are left.

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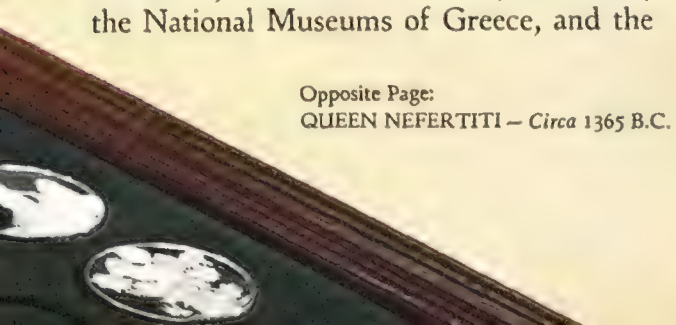

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From San Juan Hill in 1898 . . .

Roosevelt, mounted at far left, leads Rough Riders' charge in Frederic Remington's famous painting.

By Barbara S. Kraft and Donald Smythe

How T.R. tried in vain to fight in World War I

Aching to relive his San Juan Hill charge, an aging Roosevelt begged President Wilson fruitlessly for a fling at glory in a real *war*

"We had always quite simply taken it for granted that if there should be a war, Father would be in it." Alice Roosevelt Longworth, daughter of Theodore Roosevelt, was writing of her family's expectation. In this instance, his eldest child knew her father well.

When required, Roosevelt spoke softly, but what he delighted in was the flamboyant, the daring that added spice to the fulfillment of duty. When he was police commissioner of New York City, he would masquerade in black cape and broad-brimmed hat, "Haroun-al-Roosevelt," wandering nocturnally through evil haunts. When he was shot in the chest, just before he was to make an address in the 1912 campaign, he satisfied himself he wasn't going to die and then told his audience, "You would find that if I was in battle I would be leading my men just the same. Just the same way I am going to make this speech."

When war was declared against Spain in 1898, Mrs. Roosevelt was recovering from a difficult operation, but Roosevelt had to go. His regiment, the First United States Volunteer Cavalry, nicknamed the Rough Riders by the press, were, he thought, a microcosm of

. . . to frustration at White House in 1917

After inconclusive meeting with President Wilson,
T. R. talks to reporters outside White House.

America. From the West: cowboys, sheriffs, marshals, retired soldiers, a couple of ex-convicts; and from the East: Ivy League athletes, clubmen, policemen.

Roosevelt, said Richard Harding Davis, "mounted high on horseback, and charging the rifle-pits at a gallop and quite alone, made you feel that you would like to cheer." At the end of his second day of battle, Roosevelt had the men of six regiments under his command. He had charged on horse and on foot and they had taken the blockhouse on San Juan Hill. He had killed a Spaniard with his revolver. His words, written from the field to his close friend, Henry Cabot Lodge, best bespeak thoughts and attitudes which did not change in the years that followed: "I am more than satisfied even though I die of yellow fever tomorrow, for at least I feel that I have done something which enables me to leave a name to the children. . . . For the first hour of the last battle we had a very uncomfortable time. . . . But then came the order to advance, and with it my 'crowded hour.' "

While President he fought other battles. By the fall of 1908, he was explaining both to himself and to another friend, John St. Loe Strachey, his view of his immediate future after he left office. "If a war should occur while I am still physically fit, I should certainly try to raise a brigade and, if possible a division of . . . mounted riflemen, such as those in my regiment ten years ago."

And then, finally, it seemed that the opportunity came. One day in January 1915, Roosevelt sulked in his study at Sagamore Hill, distressed by the Wilson administration's apparent determination to keep out of World War I. To cheer his father up, Theodore Roosevelt jr. invited to Oyster Bay Colonel Gordon Johnston, who had served as his father's mounted orderly and riding companion during Rough Rider days. Johnston suggested that war might yet come to America and mentioned that Roosevelt might think of forming a military unit to serve in it. Roosevelt seized on the suggestion eagerly. As James G. Harbord remarked

Miss Kraft is writing a book on the Henry Ford peace expedition; Smythe, a Jesuit priest, is author of Guerrilla Warrior: The Early Years of John J. Pershing.

Lt. Col. Roosevelt of the Rough Riders—the First U.S. Volunteer Cavalry—modeled 1898 khaki uniform. Many of the troops wore the traditional army blue.

later, ". . . What was suggested more or less to divert an ill man became an historic incident."

Roosevelt immediately began making up a list of names—old friends and acquaintances—who would command various components of his military force. He had Johnston bring him the Tables of Organization, warming to the task as his division grew on paper.

Early in March the story hit the papers: Roosevelt and others were raising an "American Legion." Men who met the qualifications were to send in their names and take the pledge that, when called upon by their government, they would serve. Frank Knox, newspaper owner and former Rough Rider, came to Oyster Bay and sat with Roosevelt before the fire, planning the division "like two small boys playing at soldiers," or so it seemed to Mrs. Roosevelt.

Near the end of July, while visiting the San Francisco exposition, Roosevelt gathered about him a small group of potential officers. He wanted his division organized, equipped and ready to go to Europe the moment war was declared. It would contain cavalry, infantry, artillery and engineers, like a separate corps. Back at Sagamore Hill, Roosevelt voiced a sentiment he expressed thereafter with some frequency: If he went, he expected that "after a certain amount of hard service, I should break down." But till then he "would have a little more than paid for my keep."

By the end of summer the preliminary arrangements for the division were completed. T.R. was ready to get it together and go over to Europe in 90 days.

When the news broke in February 1917 that the Germans were resuming unrestricted submarine warfare, Roosevelt wrote Secretary of War Newton D. Baker, reminding him that he had on file in the War Department an application to raise a division. Did it look like war, T.R. asked? If so, he would cancel a Jamaica trip.

Secretary Baker replied rather curtly: "No situation has arisen which would justify . . . a postponement. . . ."

When the President broke diplomatic relations with Germany, Roosevelt canceled his Jamaica trip anyway. In a courteous note, he tried to move Baker to action, asking that Captain McCoy, his proposed Chief of Staff, be sent to him so that they could talk things over regarding the future division. Baker then tried, in vain, to dismiss the entire matter by reading him the law. The War Department could not act without the sanction of Congress. If war came, no doubt Congress would provide for volunteer forces. And there the matter rested for the time.

Roosevelt then asked the Allied ambassadors to inquire whether their governments would welcome his division in the event that America went to war and he personally was not allowed to. (The French secretly and unofficially said yes.) At his office at *Metropolitan Magazine,* which served as division headquarters, a small staff was busy handling paper work. Still, some of the correspondence Roosevelt himself took care of. He asked a friend at the Police Department for two "horses with good manners who will stand fire" and

In 1915, ex-President Roosevelt chats with his boss in 1898, Gen. Leonard Wood, whom many thought should have commanded the AEF instead of Pershing.

gently carry "an elderly Major-General who has been President of the United States and who has broken all kinds of bones."

Thousands of applicants were advised of qualifications: Men had to be between 20 and 30 (with some exceptions), able to handle a rifle and "take care of themselves in the open," preferably retired noncommissioned officers who were still physically fit. Men whose families would suffer financially by their absence would not be accepted.

As the days dragged on, Roosevelt's patience, never very long, shortened and he threatened to go to war whether his country did or not. On March 19, in the wake of three German torpedoings of American ships, Roosevelt returned to the attack.

Newton D. Baker told Roosevelt that there were plans in the works for volunteer forces, but they would be commanded by regular army officers only. That last remark sent Roosevelt to his pen and paper: "I am a retired Commander-in-Chief of the United States Army, and eligible to any position of command over American troops to which I may be appointed."

Baker's reply to Roosevelt was as devastatingly curt as Roosevelt's was unrealistically vainglorious. At the end of March the *New York Times* noted briefly that Roosevelt had filed an application for a division. The story appeared on the amusement page.

On April 2 President Wilson went before Congress to ask for a declaration of war against Germany. Roosevelt stopped at the White House for an impromptu visit, but the President was in a Cabinet meeting and could not be seen. In a press release Roosevelt called the President's war message "a great state paper. . . ." To make it effective, "We must send troops to the firing line as rapidly as possible." He added that he hoped to be allowed to raise a division "for immediate service at the front."

A KKK company

By this time a separate office was opened on Fifth Avenue to handle division matters. Inquiries were coming in at the rate of a thousand a week, including offers to raise both Negro regiments and a company of Ku Klux Klan members from Alabama. Roosevelt kept saying he wouldn't be allowed to go, but he ordered an army regulation hat. He wrote Senator Henry Cabot Lodge to "look after my interests when the military legislation is passed," and sent him copies of his correspondence with the War Department, urging him to pass them around to interested Senators and Congressmen. "As regards myself, if there is any doubt of the President's power to appoint me, let the law specifically declare that I can be appointed."

If Lodge thought it was necessary, Roosevelt would appear before the military committee or the President. On April 10 he was in Washington to see Wilson.

His co-organizers had told him he must go, Rough Rider hat in hand, to the White House. "Not an agreeable task for him," James R. Garfield noted in his diary. Indeed it was not—asking this favor of a man whom he despised. In public and in private, he had said that Wilson was without "a spark of manhood," was a base demagogue, an utterer of "weasel words," a hero to "flubdubs and the mollycoddles."

The President, too, had strong feelings about his visitor. Like Roosevelt, he was a great hater and he could not have been unaware of what Roosevelt had said about him, or insensible to it. He personally believed that Roosevelt saw the war as a playground for his egotism. " . . . I really think the best way to treat Mr. Roosevelt," he once told Joseph P. Tumulty, his secretary, "is to take no notice of him. . . . After all, while what he says is outrageous in every particular, he does, I am afraid, keep within the limits of the law, for he is as careful as he is unscrupulous."

Despite the deep hostility of both men, the meeting

Teddy Roosevelt tries to fight

went cordially enough. Selecting his words very carefully, Roosevelt congratulated the President on his war message, said it was a great paper and that he was there to help him make it good. While he had differed with the President in the past, now that war was declared bygones should be bygones. If the President would give him permission to raise his division and take it to Europe, he would give his word never to oppose him again politically. He explained that his request for volunteers would not undercut the Wilson draft legislation before Congress, since his men would not be included in the draft.

That night, April 10, Roosevelt held court at the home of his daughter, Alice Longworth. Ambassadors of the great powers were there—Jusserand, Spring-Rice, Sato—high ranking army and navy officers, Congressmen and Senators, including Lodge. He urged the Congressmen to support Wilson's bill and assured them that his proposal for volunteer forces was in no way inimical to the President's program. Volunteer groups were only a stopgap, but not to use them was foolhardy and a grievous injury to the country.

When Secretary Baker arrived, Roosevelt took him upstairs and made his pitch. The amiable Secretary, who considered war an anachronism and Roosevelt's success at San Juan Hill a matter of luck, said little. He thought Roosevelt was congenitally incapable of taking orders, despite his best intention, and would do as he pleased once he got to France. After the meeting, Roosevelt said to a newspaperman, "I had a good talk with Baker—I could twist him about my finger could I have him about for a while."

As soon as Roosevelt returned home he wrote the chairmen of the military affairs committees, urging them to amend the administration bill to provide for volunteer forces that would "put our flag on the firing line" as soon as possible. He explained his fitness to command. He sent a copy to Baker, to show what a good boy he would be if given a place on the team.

Baker knew there had been a drastic failure of communication, which he hastened to set aright, lest "an apparent acquiescence in a plan which I do not approve" would lead Roosevelt to false conclusions. He was, he told Roosevelt, opposed to the division in principle and for two reasons: (1) The War College Division of the General Staff recommended using existing officers for training troops, and (2) if any expeditionary force were sent, it should be headed by professionals. Men's lives were at stake. Soldiers should not be thrown into battle unless trained and commanded by men "who have devoted their lives exclusively to the study of . . . military matters"; "any mere sentimental consideration" must be disregarded.

Roosevelt exploded: "He has the blindest faith in the General Staff and the graduates of West Point. He does not realize that a muttonhead, after an education at West Point or Harvard, is a muttonhead still." One week later, he sent back an 18-page typed letter, among other things reminding Baker "that I have commanded troops in action in the most important battle fought by the United States Army during the last half century" and calling Baker's advisers men "of the red-tape and pipe-clay school. . . ."

T.R. too hard to control

Baker turned the letter over to generals who argued that poorly trained men would be a weak link in the battle line, that the volunteer system produced inefficient officers and that such a system would wreck their plans for a scientific, democratic army. The Chief of Staff, Hugh L. Scott, warned the Secretary of War that an ex-President would be a hard man to control or discipline should he be insubordinate. "Consider what a ridiculous figure you would cut, attempting to punish Mr. Roosevelt by court-martial!"

In Congress, Roosevelt's backers had Senator Warren G. Harding introduce an amendment authorizing volunteer divisions. The draft bill passed but, since the Harding Amendment was attached to the Senate version, a joint committee met to work out a compromise.

Meanwhile support for the Roosevelt division was growing. Volunteers applied constantly, in early May at the rate of 2,000 a day. Marshal Joffre, in America on a military mission, urged that some American troops be sent at once. Said a member of a British military mission: "Our great and immediate need is troops. The presence of Roosevelt at the head of even so small a force as a regiment of your troops, marching through London now, would be worth more than anything else you can do in the immediate future."

On May 5 Roosevelt had his formal reply to the 18-

Cartoonist Clifford Berryman catches the great hawk of World War I in action. A man who didn't foul and didn't shirk but hit the line hard, wrote T.R., was a man who would fight for national honor.

page scolding he had given Baker: The Secretary would stick with his advisers. Only a well-trained army would go overseas. It was a carefully phrased refusal but Roosevelt, undeterred, responded with another letter. Baker answered with finality, saying in effect: I'm in charge here and you will have to take my word as final and it is No. Baker wrote on May 11, the day after the Congressional Conference Committee had sent the draft bill back to both Houses *minus* the Harding Amendment.

By this time the country was growing impatient. The war had been on more than a month and still there was no army bill. Petitions flooded Congress to cut out the politicking and get on with the war. Roosevelt, fearing that a fight would bring the accusation of holding up the nation's war preparations, telegraphed his supporters to let the matter die.

He was incapable of believing that his opponents had considered the question on its merits; they must have acted out of unpatriotic or selfish motives. In a speech in Brooklyn on May 8 he said: "I ask only that I be given a chance to render a service which I know I can render, and nine out of ten of those who oppose my rendering it do so because they believe I will render it too well." And on May 10, he wrote his friend Owen Wister: ". . . This Administration is playing the dirtiest and smallest politics. . . . Wilson feels tepidly hostile to Germany, but he feels a far more active hostility toward Wood [General Leonard] and myself."

The Draft Law was finally signed on May 18. It contained a provision which permitted, but did not require, the President to call for volunteer units. Until then Roosevelt accused Wilson of using Baker, the General Staff and Congress to do his dirty work. If

Teddy Roosevelt tries to fight

Appearing before 18,000 recruits at Camp Grant, Rockford, Illinois, Roosevelt (above) accepts enforced role as a civilian—not a troop commander.

Wilson didn't let him go, Roosevelt wrote just two days before the bill passed, "I'm not a wooly lamb, and I am going to have a definite show-down." On the 18th the President gave a statement to the press in which he said he wasn't sending any volunteer division, "at any rate at the present stage of the war," though it would be "agreeable" to compliment Roosevelt and the Allies by doing so. However, "the business now in hand is undramatic, practical, and of scientific definiteness and precision." Then he telegraphed his regrets to Roosevelt, suggesting, in effect, that he read his daily paper for his reasons, adding only that "I need not assure you that my conclusions were based entirely upon imperative considerations of public policy and not upon personal or private choice."

At a press conference the next day, Roosevelt was a "wooly lamb" after all, with a weak bleat. He congratulated Pershing, said he was pleased Americans were finally going overseas to fight and that he would spend the war pushing Liberty Bonds and helping in recruiting drives. His only protest was petulant: If Wilson had accepted his offer in February, his division would be sailing that coming Monday and would be ready for the trenches in two months, with the help of only one-twelfth of the regular army officers going in the Pershing force.

So Roosevelt fought the war vicariously, through his four sons, all of whom served overseas. "I am very genuinely proud," he wrote a friend, "that they are all eager to prove their truth by their endeavor." A four-starred flag hung from the window at Sagamore Hill. He wrote often of his longing to be with them and with others, reliving his own crowded hour on the hill outside Santiago. He sent his daughter-in-law an old photograph "of a preposterous elderly creature, the father of *real* soldiers in a *real* war, at a time when he went to the only war there was in his time!" His

At Indianapolis, the Colonel joins dignitaries—below, under the watchful eye of a boy scout—in signing a pledge to buy War Savings Stamps.

daughter Alice wrote that he talked about his sons fighting abroad "with grim elation. . . . He said how certain it was that several, perhaps all, would be wounded, possibly killed."

He whipped the administration with his pen and his tongue, refusing to support in silence "a system of mixed knavery and imbecility." But it didn't satisfy; he wearied of talking. His only joy was in the reflected glory of his sons and his men, the Rough Riders, many of whom were again in service. Always, he felt the agony of not being "allowed to *do* something."

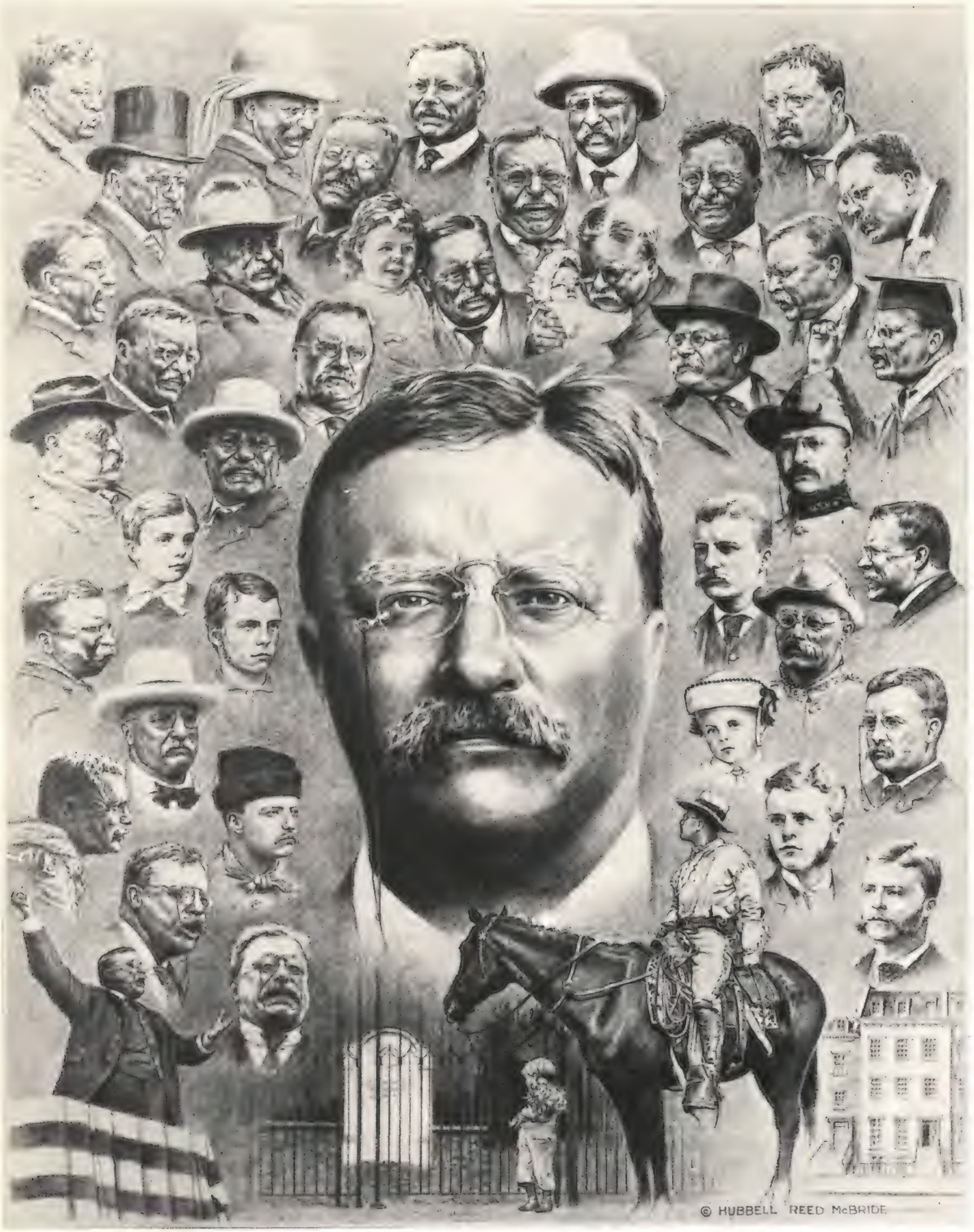
His health gave out

Finally, his health gave out. His minor physical handicaps, at that time, included blindness in one eye and a would-be assassin's bullet in his chest that caused dry bronchitis. His rheumatism kept him from exercising and his body had never recovered from severe fever contracted on a Brazilian trip. In February 1918 the fever recurred and he left the hospital with the hearing gone from one ear. In July his youngest son was killed in France. Though he had expected his boys might die, it was a grave shock; but again he bore it proudly. In the fall, acute inflammatory rheumatism sent him to the hospital once more. But Republican victories in Congress buoyed his hopes and he expected to lead his following from the wilderness.

Quite unexpectedly, he died in his sleep one night in early January 1919. "If I should die tomorrow," he had written the year before, "I would be more than content to have as my epitaph, and my only epitaph, 'Roosevelt to France'—to have it as the only thing which should keep alive my memory to my children and grandchildren." He was buried in Oyster Bay, his quiet funeral attended by a government delegation, his family and friends, among them a contingent of Rough Riders. The 27th of this month marks his 115th birthday. The navy that he revitalized as President celebrated that date as Navy Day until 1972.

From early manhood, Roosevelt had wanted his life to follow two courses. One led to political power in peacetime, the other to battle during war. Had he realized the latter opportunity in World War I, he would have happily fought in France and won the Presidency in 1920 or, perhaps equally happily, have died in battle. Instead, he had neither wish at the end. Many years before his death, he sent a friend a translation of a Chinese poem he much admired. Its ending is perhaps the most fitting comment on his last years:

How pitiful my plight!
With weary bones and withered sinews,
Powerless to restore unto light
The setting Sun and darkening Heavens.



"And One Man in His Time Plays Many Parts" reads the caption for this retrospective picture. It shows him in all his life's stages: wistful child and handsome Harvard lad, rancher and Rough Rider, politician and President, big-game hunter and explorer, proud father, doting grandfather and always the perpetual youth—a quality considered endearing by friends but not by derogators.

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By William Cole

Dr. Jackson's war on the sickle cell

Pediatrician, hematologist and humanist, he is a leader in the campaign against a vicious blood disease that predominantly affects blacks

In 1969, when Dr. Rudolph Ellsworth Jackson left his post at Children's Hospital of Philadelphia to go to St. Jude Children's Research Hospital in Memphis, many of his leukemia patients broke down and cried. One family presented him with a gold wristwatch. Others traveled to Memphis so that he could continue to care for their children.

Before he went to St. Jude, Dr. Jackson had as many white patients as black, for leukemia plays no racial favorites in its choice of victims. Shortly after his move to Memphis, however, many more of his patients were black. This was not because of choice. For he was now battling with another blood disorder, sickle cell anemia, which is just as prevalent as leukemia but far more neglected. This disorder, transmitted from parents to children, is found predominantly in blacks.

Relatively obscure until 1970, when it burst politically as well as medically on the scene, sickle cell is the most common inherited blood abnormality in the United States, present in more than two million black Americans. While in most cases the abnormality occurs in a benign "carrier" form known as the sickle cell

Eight-year-old Rudolph jr. twangs a guitar for Kelley (left), Kimberley and his mother and dad.

trait, an estimated 50,000 blacks suffer from the life-threatening form, sickle cell anemia.

As a pediatrician and hematologist, Jackson is well qualified for his arduous battle. A native of Richmond, Virginia, where his father was in the postal service, he attended Morehouse College in Atlanta and received his M.D. in 1961 from Meharry Medical College in Nashville. After a year's internship he entered the U.S. Navy and served as a pediatrician. After his discharge in 1967, he received a fellowship in hematology at Children's Hospital of Philadelphia.

A dynamic man with a boyish grin that makes him look younger than his 38 years, Jackson has a hearty appetite, which he makes no effort to curb, yet retains his trim 140 pounds. Too loaded with energy to sit behind a desk for long, he constantly leaps up during discussions to pace about and gesture.

"At college I went out for football," he reminisces wistfully. "I had my heart set on making the team, but I weighed 40 to 90 pounds less than the rest of the squad. After a few weeks of scrimmages, I quit before the coach got a chance to ask me to."

While Jackson had seen many sickle cell patients before, it was at St. Jude that he managed his own clinical research program for the first time. A patient usually came to the hospital when undergoing a "crisis"—a period of excruciating pain in the abdomen, joints, limbs or other areas. Severe crises may occur anywhere from three to five times a year, says Jackson.

The pain is due to lack of oxygen in tissues. Blood cells get their red color from hemoglobin, an iron-rich protein that transports oxygen from the lungs to the tissues of the body. In sickle cell anemia, there is a defect in the hemoglobin that causes the normally round red blood cells to form a crescent or "sickle" when they lose oxygen. These sickle cells tend to twist and bind together, clogging the small blood vessels and blocking the flow of blood to surrounding tissues.

The abnormal sickle hemoglobin gene (Hb S), which is at the root of the trouble, is passed from parents to their children. One hemoglobin gene is inherited from each parent. If both of these are Hb S, the child will develop sickle cell anemia. If, as happens in most cases, the child inherits one Hb S gene and one normal hemoglobin gene (Hb A), he will inherit only the sickle cell trait and thus be a carrier. In this condition, the red blood cells have enough hemoglobin A to offset the effects of hemoglobin S. Persons with the trait may be bothered by high altitudes or other situations in which the oxygen pressure is low, but they usually live healthy, normal lives with no symptoms.

The trait may be more common in blacks because of their African ancestry. Studies indicate that individuals with the sickle cell trait have increased resistance to malaria, which was frequent in sections of Africa. The trait itself may be beneficial under those conditions, but is no longer so in countries like the United States where malaria is under control.

"The possible danger is not to the trait carriers

themselves but to their children," Jackson points out. "As they are not indisposed in any way, most persons with the trait are unaware that they are carriers. Unsuspectingly, two parents with the trait may give their children a double dose of Hb S—sickle cell anemia."

In addition to painful crises, symptoms of this severe disorder include anemia, impaired growth and development, jaundice, kidney disturbances and an increased susceptibility to serious infections like pneumonia. At present, there is no cure for the disorder. Victims often die in childhood. Preventive treatment consists mainly of avoiding infection, conditions of low oxygen pressure, dehydration and stressful situations that may trigger crises.

Although sickle cell anemia has been recognized in the United States for more than 60 years, minimal attention was paid to it before 1969 when Jackson and others, stirred by the plight of sickle cell victims, started awareness campaigns across the country.

But when sickle cell programs like the one at St. Jude were set up, cries of "genocide" were heard from black militants who feared that screening and counseling would frighten blacks with the trait into refraining from having children.

According to Dr. Joseph Simone, who worked closely with Jackson at St. Jude, Jackson did a lot to cool the heated atmosphere surrounding the sensitive issue. "He's a born mediator with an uncanny ability to adapt to any situation," Dr. Simone says.

In his research studies, Jackson, together with other investigators, sought new forms of treatment that would reverse the sickling process, thereby shortening or even preventing the painful sickle cell crises and the resultant tissue damage. For a year and a half he pursued these studies, cared for his leukemia and sickle cell patients, involved himself deeply in Memphis community activities, keeping the grueling schedule to which he has always adhered. Then, abruptly, his work at St. Jude ended. President Nixon's February 1971 health message to Congress publicized sickle cell anemia, giving it high priority as a target. Elliot L. Richardson, who was then Secretary of Health, Education and Welfare, set up a Sickle Cell Advisory Committee composed of 11 distinguished professional and lay leaders, of whom eight were black. Jackson was one of the members.

In March 1972 Jackson received another appointment from Secretary Richardson—this time as coordinator of the intensified, rapidly expanding federal sickle cell disease program.

While reluctant to leave St. Jude, he couldn't turn down this opportunity. "He saw this as a chance to help on a national scale," says Dr. Donald Pinkel, medical director at St. Jude until last month. "We understood this, sorry as we were to see him go. That ended our sickle cell program. We just haven't been able to find anyone to replace him."

With his wife Jacqueline, whom he has known since high school, and three children—Kimberly, 11, Rudolph jr., 8, and Kelley, 5—Jackson now lives in Columbia, Maryland, not far from his office at the National Institutes of Health (NIH). The Jacksons, who have previously lived in affluent, predominantly white neighborhoods, chose Columbia because it is a "new idea in living," a completely integrated community with 27,000 inhabitants.

"We wanted our kids to have a wide exposure," says Jacqueline Jackson, who taught school in Memphis and who now does volunteer work as well as teaching in the model community. "Columbia has both high and low income housing. Each of the four villages has its own school; our kids walk to classes along wooded paths. It's worked out beautifully."

The Jacksons, who have a comfortable ten-room

William Cole, a New York free-lancer, wrote about explorer Finn Ronne in SMITHSONIAN, *June 1972.*

Sickle cell doctor

house, like to take a picnic lunch and explore the countryside. When Jackson is away on his frequent trips, the rest of the family bicycle, swim, skate and otherwise enjoy the outdoor pleasures that were built into this planned community.

Jackson's relations with his colleagues at NIH are as harmonious as those with his neighbors at home. He is responsible for coordinating the sickle cell activities of several federal institutions. In addition, Jackson heads NIH's Sickle Cell Disease Branch, recently established in the National Heart and Lung Institute (NHLI). This is the focal point of all government sickle cell research and clinical programs. Federal funds to finance this national effort jumped from $1 million in fiscal 1971 to $10 million in 1972. The fiscal 1973 budget reached $15 million and expenditures of $16 million are anticipated for 1974.

Many fine scientists make poor administrators, but not Jackson. "Rudy is unique," says Dr. George Riley of his staff. "There's no more sensitive spot you could put a man in and no more sensitive man you could find for the spot. He's as acutely attuned to the social and political crises involved in this disorder as he is to the medical crises, and he has sort of an administrative bedside manner in dealing with people of all races and viewpoints."

The most urgent need today, as Jackson sees it, is informing and educating the public about sickle cell disease—not just the target population but the total population. "We've heard of trait carriers—perfectly healthy people—being fired from jobs, denied employment and insurance or, if they're school kids, told that they shouldn't participate in sports," he says. Many blacks, feeling that the trait was a stigma and that they would be discriminated against if they were known to be carriers, refused to cooperate with screening programs. When new compulsory sickle cell screening laws were enacted in as many as nine states and in the District of Columbia, black communities were distressed. Sensational and inaccurate television and newspaper reports, depicting sickle cell as a "killer disease," fanned the fear.

Jackson and other black medical leaders such as Drs. Roland B. Scott and Robert F. Murray of Howard University and Dr. James E. Bowman of the University of Chicago agree that much of the attention lavished on the disorder has been misdirected. The backlash against mandatory screening laws has led many states to amend or repeal their original legislation.

"All screening programs should be voluntary," Jackson emphasizes. "And counseling should be informative, not advisory. The individual should be furnished with all the facts he needs to make an *informed decision*. If he then requests information on family planning, this can be provided, but the decision to have or not have children should be his without the slightest outside pressure."

Each trait carrier is informed that if he marries another carrier, the chances are (a) one in four that each child will be completely free of the anemia and the trait; (b) two in four that each child will become a carrier; (c) one in four that each child will become a victim of sickle cell anemia. (If one parent is a carrier and the other normal, only the trait may be passed on, not the disease.)

Hope for effective treatment

Research efforts to improve treatment for sickle cell anemia have employed such agents as urea and cyanate, drugs which alter the sickling process in laboratory experiments and clinical trials. There is optimism about eventually coming up with an effective treatment using these or other agents. "We feel we understand the mechanism of the disorder," Jackson states. Diagnostic techniques, he points out, have been greatly improved. It is now possible to detect sickle cell anemia in newborn infants. In such cases, with proper care, the frequency of crises and complications may be reduced, thus brightening the patient's prospects.

"Through education, the opposition to our program is dying down," Jackson says. "Some of the most militant groups, such as the Black Panthers, are now working the hardest against sickle cell disease."

In the new pride of getting together to do something about black problems, old fears of being stigmatized for having sickle cell disease are beginning to disappear. As Jackson points out, if the belated but now intensified war on sickle cell disease ends in victory, the fact that this will be accomplished mainly by blacks effectively working in a common cause will be a source of pride to all blacks.

Dr. Jackson searches through the shelves of a medical library at the National Institutes of Health.

The Jackson quintet walks in Columbia, Maryland, the community where they are now living.

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The modular, boxlike galleries of the museum occupy a choice hilltop site in Jerusalem.

By Alfred Friendly

Israel is building a great museum of cultural treasures

The Jewish nation, observing its 25th anniversary, has good reason to be proud of this fast-growing, popular institution

This citadel gate is a museum treasure; its huge lintel and capitals are from ninth-century B.C. Hazor.

Photographs by Lee Boltin and the Israel Museum

Like those of its individual citizens, the needs of a nation's soul are not to be fulfilled merely by the routine tasks of the day, however dynamic and constructive those may be. More than many another land, Israel hungers for spiritual nourishment so that a deeper purpose and meaning may validate its pressing daily imperatives—the burden of military defense, the need for new housing for the flow of immigrants from Russia, the battle for production and exports and the struggle to advance its science and technology.

A major servitor to that inner demand is the Israel Museum, an ornament of this 25th year of the nation's independence. It is atop one of the loveliest elevations in Jerusalem, and staggered along the slope in a series of cubes reminiscent of a Palestinian hilltop town. As designed by Israeli architects Alfred Mansfeld and Dora Gad, the individual rectangular units are in themselves unremarkable, but the whole, as New York critic Emily Genauer found, "both as architecture and as a showcase for art is more satisfying than any new museum I have seen in America and Europe."

From the earliest days, mountains have played a deeply mystical role in Jewish religious thought: To have placed a national museum on a summit in the Judean hills was an inspired gesture. Credit for it goes to Teddy Kollek, the mayor of Jerusalem, the spiritual and temporal father of the museum, the driving force

The Billy Rose Art Garden has an excellent collection of modern sculpture by international artists. The rock-bordered terraces were designed by American sculptor Isamu Noguchi.

for its construction and still its staunchest supporter. Under its present director, Daniel Gelmond, the museum is growing faster than ever.

If, outwardly, the museum is one of the world's handsomest and most impressive structural complexes, its treasures within affirm in joy and pride the continuity of Jewry's 3,700-year-old history. A national museum, an English essayist has written, is "first and foremost, a centre for documenting a thesis we hold concerning our position under the stars." The Israel Museum splendidly fulfills that obligation.

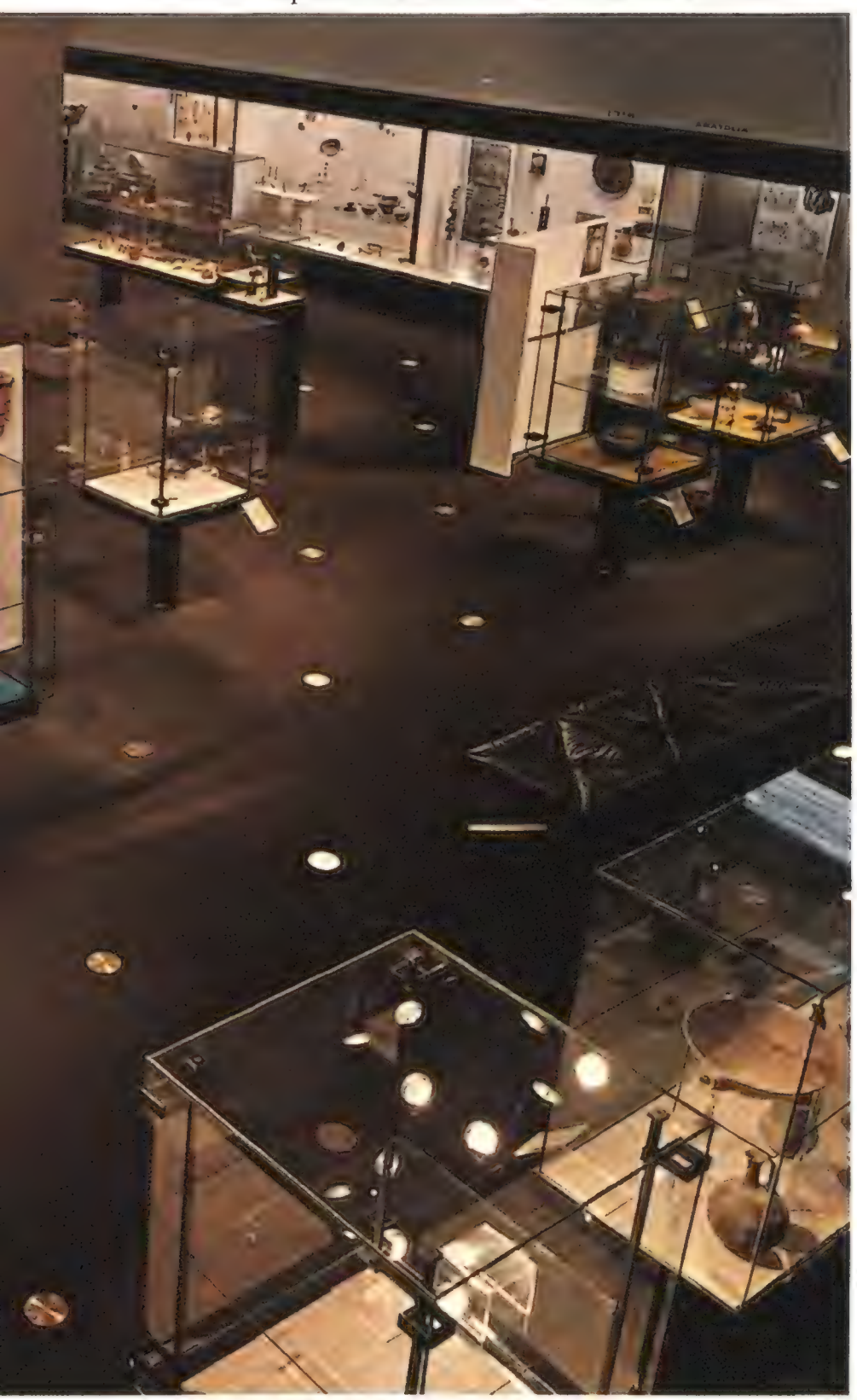
By last year, the eighth of the museum's existence, half of Israel's adult population had visited it at least once, a quarter two times and 17 percent three or more times. For Israelis, the museum is second only to the Wailing Wall as a place to visit. A few years ago, at the peak of the war of attrition when Israel and Egypt were trading artillery fire day and night across the Suez Canal, 4,000 Israelis stood in line for the opening of a temporary exhibition; even just after the Six-Day War, soldiers with a few hours leave from guard posts in Jerusalem swarmed its galleries. One out of every 11 Israelis is a member; the fee, to be sure, is modest, but the act of annually enrolling says much about the citizens' attachment to the museum.

At the cost of omitting some lesser collections, the museum can be considered as comprised of five major assemblages: Old Master and contemporary painting and graphics, contemporary sculpture, ethnography or Judaica, archaeology and the Shrine of the Book.

The first named is, by common consent, the weakest. The collection stresses, as it properly should, the work of Israeli artists. But its curators feel the need for

The author appeared in SMITHSONIAN *with articles on ancient Egypt's animal cult in August 1973 and on early Christian Aquileia in December 1970.*

In a well-illuminated archaeological gallery, antiquities are presented in an uncluttered display. Many objects are in freestanding vitrines, which let spectators see the exhibits from all sides.



The strikingly domed Shrine of the Book contains all seven of the original Dead Sea Scrolls.

a more abundant store of Renaissance and later European art (for Israel's heritage over the last thousand years came from the West). But there is no ready-mix, add-water-and-serve package for instantly building the Prado, the Uffizi or even the National Gallery of Art in Washington, especially when the museum is—in every department—almost totally dependent on private donors for increasing its collections.

The art section also suffers from inadequate wall-space, so that only a small fraction of its paintings can be displayed at one time. But one of the happiest features of the museum as a whole is an architectural form that admits of almost indefinite expansion, by means of more rectangular blocks spreading over and down the central hill; some of the units called for by the very large and bold master plan for the future are already furiously abuilding; in a few years a great deal more hanging space will be provided as well as expansion for more period rooms, such as the magnificent Louis XV salon (pp. 80-81).

There can be no complaint about quality in the enormously admired Billy Rose Art Garden (center, top). It displays some fine pieces of master sculptors, from Rodin, Maillol and Lipchitz (p. 79) to more recent huge and stunning works by Henry Moore and David Smith (p. 81). The garden and the nucleus of the collection were the gift of the late prince of American showmen; the design and conception of the whole was that of Isamu Noguchi, the Japanese-American sculptor. The garden lies on the west side of the central hill in a series of terraces, held in by five curved retaining walls built of rock from the site.

Ancient Philistines favored clay statuettes, such as this seated goddess from 12th-century B.C. Ashdod.

The museum's collection of Jewish ceremonial art is considered by many scholars to be the best in the world. With the Biblical injunction against graven images, which means almost no representation of human figures and rather sparse indulgence in portrayals of other living forms (lest they invite idolatry), no individual piece of Jewish religious art can produce as profound an emotional impact as, say, a Raphael madonna or an El Greco saint. One admires, instead, the conscientious craftsmanship and the wondrous variety.

For, although Jews tended to live in relatively isolated and self-contained communities throughout the Diaspora, their art was profoundly influenced by the stylistic patterns of the society surrounding them. Contrast—and revel in the charm of—the gleaming and ornate Italian synagogue chamber (p. 82) of 1700, all gesso and gold, and the 18th-century synagogue from Germany (p. 83), its barrel-vaulted roof and walls happily covered with painted fruits, vines and animals.

Jewish conceptions of an afterlife range from negative to, at best, vague; they contain no prospects of an eternity graced with either harps or houris. For immortality, then, Jews tend to look backward into their history, and that accounts in part for, one guesses, why every Israeli is a passionate archaeologist. That passion is reflected in the Samuel Bronfman Biblical and archaeological collection. In display, sensitive selection, geographical span (Iran to Italy), chronological span (hominid to medieval) and, above all, in the quality of the exhibits, it rates with the world's finest. As an incurable archaeological museum addict, I find it the easiest to enjoy of all I know.

In this, the basic architecture plays an enormously helpful role. The display areas are a series of rooms each about 15 yards square with a central pillar supporting a ceiling slanting slightly downward from four sides to the center. The visitor walks downward from one room to the next via broad flights of three or four steps. The effect is to confine the visitor's view to one section at a time, with no dismaying vista of distant, endless, foot-wearying galleries commanding a hike into next year.

One begins with stone tools as old as those of the Olduvai Gorge in Tanzania, which is to say a million years, and proceeds toward the present with a little steatopygous Venus from Çatal Hüyük in southern Turkey, the only complete neolithic one known. Then a collection of unique terra-cotta ossuaries made in the shape of houses. Then, in staggering volume, the finds of the "Cave of the Treasure" in the Judean desert—scores of ceremonial mace heads and scepters, and decorative or religious statuettes. And so, on and on, through Persian, Syrian, Cypriot, Egyptian and Mycenaean wonders.

The Shrine of the Book (p. 77) is the most controversial part of the Israel Museum, its design arousing the most furious reactions, pro and con, among its visitors.

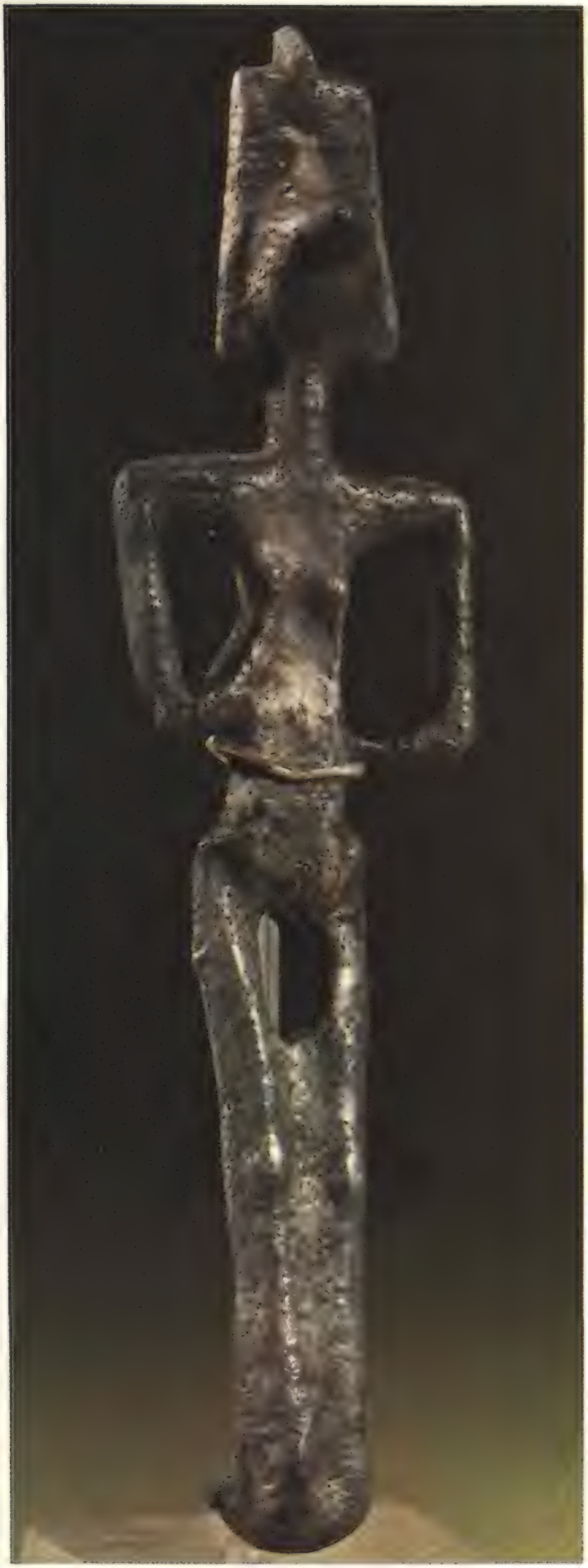
This bronze *Mother and Child* is an early-Forties work by Lithuanian-born sculptor Jacques Lipchitz.

This fifth-century B.C. terra cotta of a pregnant woman was found in a Phoenician cemetery at Akhziv.

For the larger part, the art and architecture critics condemn it as pretentious, theatrical and essentially vulgar. Most nonspecialist visitors are less offended.

The shrine stands apart from the main complex of the museum and, except for the dome, is below ground level. Its planners intended the structure to convey a "psychological" recollection of one of the caves where the documents were found. Thus one approaches via a long sweep of descending steps and enters a tunnel, in the sides of which are niches displaying papyrus letters from Bar Kokhba, the Jewish leader who rebelled against the Romans in A.D. 132-135 and was defeated by Hadrian's forces. At the end of the tunnel is a rotunda around which, again in niches, are parchment fragments, large and small, discovered during the last 26 years from the caves. In the center of the rotunda, occupying most of it, rises a circular showcase around which is a facsimile of the only complete book of the Old Testament that was discovered, the Book of Isaiah. Above, seen from the outside, the dome is in

An oil lamp, dating from about A.D. 250, has relief ornaments: ram's horn, menorah, incense shovel.



This 3,500-year-old figurine, discovered near Haifa, is so angular it could be a modern abstraction.

Probably the most elegant room in all Jerusalem is this mid-18th-century grand salon from Paris. A

the typical shape of the cover of one of the jars in which the scrolls were found, but why it should be glittering white rather than the soft russet of the baked clay originals is, to be charitable, incongruous.

Each year, the museum mounts about 25 temporary smaller exhibitions and three large ones. At the time of my visit one of the major special displays was a glorious re-creation of Moroccan life and art, with special emphasis on their Jewish features. This show illustrated dramatically the whole outgoing purpose of the museum and its contemporary—even political—relevance to the Jewish state. Some 25 years ago, when the first flow of Moroccan immigrants began, the newcomers sensed themselves several cuts below the earlier pioneers from Europe in education, cultural attainments and sheer modernity. The resultant inferiority complex of these and other "Oriental" immigrants has been a problem plaguing Israel ever since.

Thus, in addition to its intrinsic merits, the exhibition had an ancillary purpose: to convince the tens of

gift from the Rothschild family, the room was dismantled and shipped to the museum in 19 crates.

thousands of emigrants from Morocco that their background and their culture were as valid and valuable as those of any of the other new venturers in Zion.

The exhibition was hard to put together. Like East European Jews who came to the New World around the turn of the century and who also felt inferior and wanted to put their past and their origins behind them, most of the Moroccans had hidden or rid themselves of their traditional costumes and former possessions. It was a problem to ferret them out or borrow material from abroad.

But when, at last and after four years of effort, the exhibition was opened—with replicas of Moroccan shops and city and village life, with costumes, artifacts, carpets, jewelry and handicraft items from the western Maghreb, the Moroccan-descended Israelis flocked to it—proudly wearing their "Old Country" sabbath-best finery, hidden from view these 10 to 20 years. The museum had spoken to them and they were making a happy reply.

American sculptor David Smith is represented by a late work, *Cubi VI* (1963), made of stainless steel.

The museum owns two European synagogue interiors. The one above is north Italian and is from about 1700. Its wooden Ark of the Torah—carved, painted and gilded—is in high baroque style.

This barrel-vaulted ceiling, of wood planking and painted in 1735, comes from a synagogue in Horb, Germany. Like a tapestry, the ceiling has a profusion of flowers, fruits and animals.

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You're also surrounded by entertainment. Singers, dancers, musicians—in both the main lounge and our intimate shipboard after hours club. But on a Viking voyage, you get something more than entertainment. Enrichment. Experts discussing topics that range from the ecology of the ocean to space exploration—to the manners and mores of the varied cultures and peoples you'll be visiting. So you can capture the Pacific, if you wish, without even leaving the ship.

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3. Circle Pacific. 68 days from San Francisco and Los Angeles. The South Seas, Australia, the Orient and East Indies—including Bali—all in one cruise. Sails February 23 and March 27, 1974.

4. Alaska/Orient (Northern Circle). 51 days from San Francisco and Los Angeles. Canada, Alaska, the Aleutians, Japan (including the Inland Sea) and something different: seldom-visited Seoul, Korea. This unusual cruise sails June 16, 1974.

5. Mexico/Tahiti/Hawaii. 29 days from San Francisco and Los Angeles. Pick your paradise: Puerto Vallarta, Acapulco, Papeete, Moorea, Lahaina. Sails May 17, 1974.

6. Canada/Hawaii/Mexico. 27 days from San Francisco and Los Angeles. North of the border to Victoria and Vancouver, south of the border to Puerto Vallarta, Mazatlan and La Paz, and beyond the horizon—to Honolulu, Hilo and Lahaina. August 7, 1974.

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Photographs by Yoichi Okamoto

Little red worms and ancient lakes in the Balkans

Smithsonian-sponsored U.S. limnologists and their Yugoslavian colleagues are getting to the bottom of things in two rare basins

"Learned men up to their knees in mud, looking for little red worms."

That is how one scientist characterized his particular field, limnology, which is the study of fresh waters —of rivers, bogs and, preeminently, lakes. Naturally there is more to a lake than little red worms. To begin with, think of a lake as the negative image of an island —as an outpost of water surrounded by land—for, like an island, a lake is a more or less closed system and this notion is the starting point for most modern limnological research.

The red worms buried in the ooze are part of the system of a lake, as are its fish, its snails, its drifting populations of microscopic plants and animals called plankton, and the reeds along the shallow shores. Plumbing a lake's dynamics also involves some learned men seeking its geological origins, and others logging temperature gradients, density, viscosity and movement of the water. It calls for chemists to determine

Yugoslavian scientist Ivan Cado sifts Lake Ohrid's shallows for growths in stands of the reed, *Phragmites.*

the levels of dissolved oxygen and a host of mineral nutrients found in the water and in its inhabitants. (Of course, there is no such thing as a totally closed system in nature: The energy budget of a lake also depends on the streams and rivers that feed it, as well as the climate, the weather, the sun.)

The limnologist, then, explores the interactions of all these elements to find out how a lake *works.* This not only is of intrinsic interest to the scientist but it is a matter of the utmost practical importance.

So far, no group of limnologists would claim they know how any given lake really works. It is a young science, having begun in earnest around the turn of the century when it was primarily taxonomic and quantitative: What is in the lake, what are its components? There are a great number of lakes in the world, covering nearly two percent of the Earth's surface, and not all that many limnologists, so for most lakes limnological work remains descriptive by necessity. In only a relatively few lakes in the world have the components been well enough catalogued for true "systems analyses" to be done.

One of these is to be found in Yugoslavia—Lake Ohrid, a vastly deep body of water that lies athwart the border between Macedonia and Albania. Long of interest because of its great age (most lakes are geologically ephemeral; few U.S. lakes predate the Ice Ages), Ohrid is something of a limnological classic. Thoroughly described, it is ready for sophisticated analysis. Elsewhere on the Yugoslavia-Albania border is Lake Skadar, perhaps as ancient as Ohrid but otherwise quite dissimilar—and largely unstudied. In the past year and a half, each lake has been the scene of intensive cooperative investigation by American and Yugoslavian scientists under a program of which the American half is administered by the Oceanography and Limnology Program and the Office of International Activities of the Smithsonian Institution.

Lake Ohrid: probing its ancient depths

A key link in Ohrid's food chain is animal plankton. Four species are visible here, greatly magnified.

The Balkan Peninsula has virtually always been a violent place. Cataclysms tormented the landscape long before men began fighting wars there. Its craggy mountains and deep hollows were formed in the same great upheavals that created the Alps. The land is a web of fault zones. One of these faults collapsed—in the early Pliocene epoch, it seems—on the southwestern border of what is now Macedonia. The land dropped straight downward, creating a steep-sided depression which soon filled with water. Though jolted periodically by smaller movements of the Earth's crust, the great hole was never again without water, and so Lake Ohrid may have existed continuously for some 200,000 years.

The world contains few other such striking lakes of this type—graben lakes (from the German for "trench"), created by the collapse of a fault. Others are Lake Baikal in Russia, the deepest single body of fresh water in the world; Lake Tahoe in the United States, far younger than Ohrid; Lake Tanganyika, of similar age to Ohrid. "It could turn out that Ohrid's the oldest of all," says Dr. Harold L. Allen, a young assistant professor of biology at Dartmouth College and the principal American investigator of the joint Yugoslav-U.S. study of Lake Ohrid.

Twenty miles long and six miles wide, Ohrid is a relatively large lake, but in its third dimension it moves again into the realm of the superlative. At its deepest it is 950 feet, deeper than most of the continental shelf; its mean depth is 475 feet. Fed by a cold mountain river, the Drim, and by a nearby lake (another graben lake called Prespa, the waters from which apparently percolate through the dolomite rocks of the region and find their way to Ohrid), the deep lake's waters are extraordinarily pure.

A lake of such seniority and isolation is just the thing to excite a limnologist. For in these circumstances one would expect to find that the flora and fauna had had time and opportunity to develop into species unique, or endemic, to the lake. And that is precisely the case. Trout, for example, are a ubiquitous and cosmopolitan fish, according to Dr. Allen; they are hybridized throughout most of the world. Yet Ohrid claims its own brand, *Salmothymus ohridanus,* a living fossil. There are also endemic fresh-water mackerel and other fish, endemic snails, algae, gastropods and other forms. In all, there are some 300 endemic species—a limnological bonanza and an ideal laboratory for looking into the question of how various kinds of creatures arrive in a lake in the first place and then evolve into new species. Little is known about these mechanisms in an aquatic environment.

Yet another aspect of Ohrid excites the purely theoretical side of the limnological ambition: In spite of its large and vital fish population, Ohrid is what limnologists call unproductive. Fed by waters from glacial bedrock, the lake is low in nutrients. This in turn means that it is low in the plants such as algae which depend on the nutrients.

While Ohrid is the stuff of dissertations and significant contributions to science, it also contributes to the local economy. *Salmothymus ohridanus* and the other less exclusive fish species support a large number of

fishing villages (at least on the Yugoslavian side; the Albanian portion is little known and off limits to Yugoslavs, be they fishermen or scientists). The annual catch is about 250 tons and fishing is stringently regulated by the Lake Ohrid Hydrobiological Institute, but its guidelines are based on limited knowledge of the dynamics of the fish populations. Dr. Allen hopes that the joint effort at Ohrid will make possible a computer model of the lake—"a real good statement of how they can best manage the fish population without endangering it."

Recently this "unproductive" lake has become the beneficiary of a new source of nutrients for its pristine waters. High-rise hotels are mushrooming all along the Yugoslavian shoreline to house tourists attracted by the lake's pure waters. There is no waste-water treatment and the hotels' sewage, plus that of the 20,000 inhabitants of the town of Ohrid, is dumped raw into the lake. Nitrates and phosphates drain into the lake "at a rate you wouldn't believe," says Allen.

A critically important practical result of the current program at Ohrid will be to determine just how long the lake can support such conditions before the narrow shallows of the littoral area become an unacceptable mess. Nor is it purely an esthetic problem. "There is a lot of coliform bacteria there now," says Allen, "a lot of disease—even in the fish populations. It's really critical, though not recognized yet."

None of these desired results—the practical ones or the theoretical ones—would be conceivable were it not for the fact that Ohrid is already one of the best studied lakes in the world; and this is largely because of one man, Siniša Stanković. In 1936 Dr. Stanković founded the Lake Ohrid Hydrobiological Institute, a dual-purpose state agency functioning as both fish hatchery and research laboratory. Over the years he and other Yugoslavian scientists produced 337 scientific papers on the

Dr. Slave Hadzsice (left) reviews day's strategy with colleagues at Ohrid Hydrobiological Institute.

Like all of Ohrid's trout species, *Salmo letnica balcanicus* has a smooth and almost scaleless skin.

Crowded in small boat, American and Yugoslavian scientists collect samples of algae from various depths.

lake, a limnological productivity that Allen believes is "second to none except maybe Baikal."

Stanković is in semiretirement now but still puts in an occasional day at the Institute where his work is carried on by five resident scientists, plus assistants and technicians under the directorship of Dr. Boris T. Ocevski. Stanković's work and that of the current staff is what biologists call classical, that is, descriptive.

The second stage of analysis called for a great deal more money than was available to the Yugoslavs and for advanced techniques and sophisticated equipment which were also beyond the means of the Institute. After a year and a half of cooperation, the Institute's laboratory is now among the best equipped in all of Eastern Europe and the Yugoslav scientists have aptly absorbed such new techniques as the use of radioisotopes for measuring photosynthesis rates.

A major goal of the joint project has been to obtain deep core samples of the lake bottom. A barge was outfitted to carry a one-ton coring device and experi-

Untreated wastes from the growing population are becoming a threat to the lake's pure waters.

enced technicians were flown in from Switzerland. In August eight core samples, each about 30 feet long, arrived at Dartmouth. They contain sediment from the deepest part of Ohrid, the oldest limnological cores so far achieved in the world. With these cores a variety of specialists will soon begin work determining the precise age of Ohrid, logging the subsequent changes in the Earth's crust, mapping how sediments entered the lake and moved around on the bottom, and recording the changes in climate over the millennia—in short, they will be able to reconstruct the entire past history of the lake.

Funds are now being sought to extend the joint study of Lake Ohrid for an additional three years, during which time the practical payoff—the computer model of the lake—will come about. But even if limnology were to cease altogether in Macedonia, the cores now resting at Dartmouth contain enough information to make ancient Lake Ohrid one of the best understood lakes in the world.

Harold Allen and Boris Ocevski (right) inspect water samples incubating in different light conditions.

A large fraction of Lake Ohrid's rich population of snails are endemic, occurring nowhere else.

Lake Skadar: a scramble for basic information

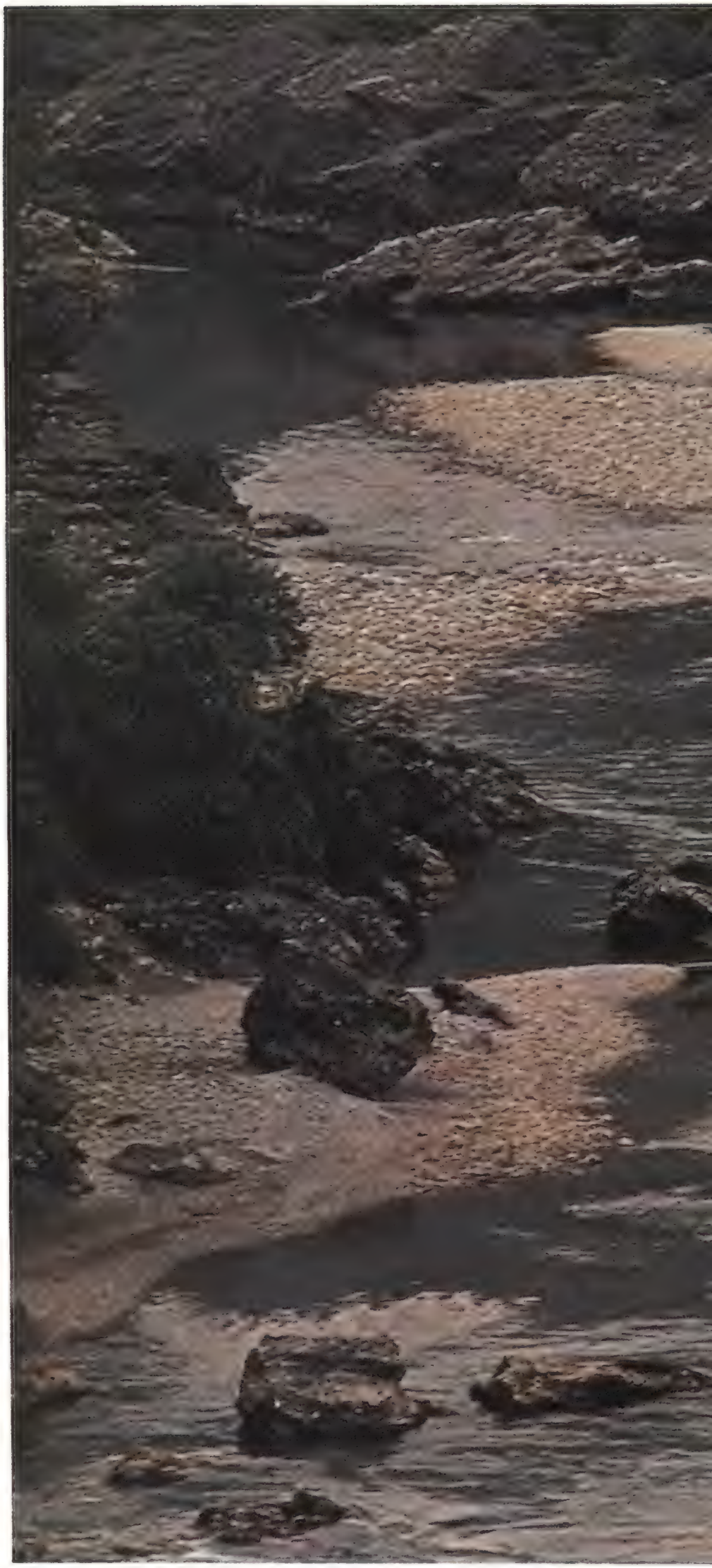
Like deep, cold Lake Ohrid, Lake Skadar may have come into being through some great seismic disturbance eons ago. Or it might originally have been part of the Adriatic Sea, later cut off when the intervening mountains heaved up from the sea. No one knows.

In fact, compared to Ohrid, relatively little is known scientifically about Skadar. Surrounded by mountains, the lake drains a vast area of some 2,500 square miles, including a section of Albania, but mostly in the Yugoslavian republic of Montenegro. Unlike 5,000-foot-high Lake Ohrid, Skadar is just above sea level; unlike Ohrid's great and constant depth, Skadar is shallow, averaging 10 to 15 feet at low water, although its depth nearly doubles when the rains of spring swell the Moraca River and the other fast-flowing, turbulent mountain tributaries. With these seasonal (but still unpredictable) floods, a narrow strip of permanent marshland and the flatlands beyond are inundated.

Local authorities plan to drain much of the floodplain and stabilize the water level, thus gaining agricultural land in what is the nation's most economically distressed region. The effects on the lake of such action are unknown, but the lake is already faced with a number of present dangers. The fast-growing metropolitan area of Titograd, which now contains one-fifth of Montenegro's population, is located on a tributary of the Moraca. An unknown amount of Titograd's untreated wastes, along with those of several smaller cities and towns, flows ultimately into Skadar. And a few miles up the Moraca from the lake is a new aluminum plant. Its untreated acid wastes also enter the lake.

"It's like taking Lake Superior and turning it into Lake Erie," said one American limnologist.

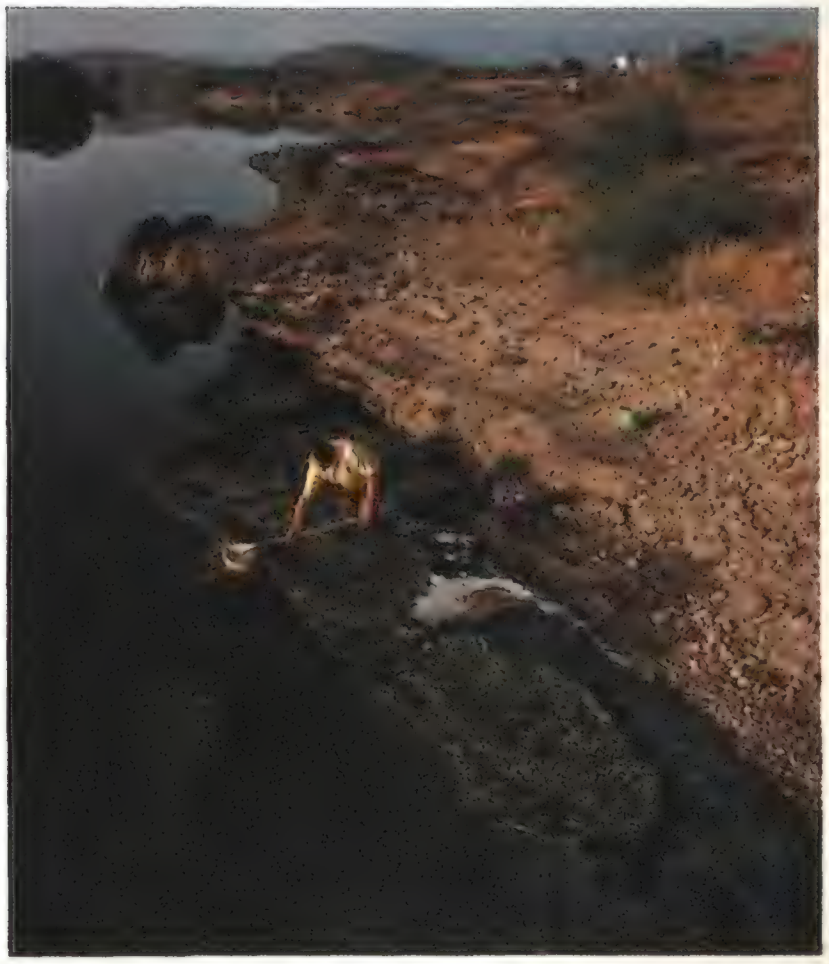
Threatened and little-known scientifically, Skadar was a tempting project for a joint venture. In the past 18 months 25 American scientists and technicians have been in and out of the area, working under the super-



Dr. Gerald Jacobi of the University of Wisconsin takes bottom samples from a Skadar tributary a few

miles above Titograd, Montenegro's largest city and a likely contributor to the lake's pollution.

Flag of his native land flutters behind Dr. Ratko Ristic, born in Yugoslavia, now a U.S. citizen.



Jacobi works among signs of pollution (note algal mat) downstream from, and in sight of, aluminum plant.

vision of Robert P. Higgins of the Smithsonian and John O. Mecom of Southern Methodist University. The Yugoslavian delegation is under the direction of Bozina Ivanovic of Titograd.

What was needed at Skadar was the most basic kind of inventory, but in that technologically bypassed area even the most basic kind of equipment was often hard to come by. A jointly written progress report of last February noted that "delivery of something as simple as nylon rope might require several weeks to several months." In summary, the report warned that the "American participant must be able to operate without a great deal of logistical support."

One target of immediate interest was the unique configuration of the lake bottom. Here and there are deep funnel-shaped holes called cryptodepressions, the deepest of which has a nearly 150-foot water column. Known as "eyes" locally, they are the result of the differential delivery of silt and sediments from the lake's turbid tributaries. Little understood ecologically, their cold waters seem to provide optimum conditions for fish, especially in the spring and summer seasons.

All in all, the lake produces about 1,100 tons of fish a year—mostly carp—and it is also the wintering ground for thousands of Europe's most sought-after game birds, including ten species of ducks. Yet, like Ohrid, Skadar is considered an unproductive lake. Chemically similar to Ohrid, its waters are poor in nutrients. It appears that a large portion of whatever nutrients do flow in via the mountain rivers are quickly taken up by the aquatic plants along the shore. So Skadar's open waters are relatively poor in plankton; its bottom-dwelling fauna are limited.

No one knows at this point how all these factors and others work in Lake Skadar, or how fragile its shortened food chain is, or how long the lake can absorb the effluents of a modernizing economy before eutrophication takes over. After a year and a half, the cooperative venture has produced a master plan for an additional four years of basic investigation. Then, perhaps, but not until then, will the limnologists be able to answer those questions.

Old Turkish fortification looms over threatened Lake Skadar, winter home of thousands of game birds.

Annette and Carlos Ramirez, owners of Daly Shoe Store in East Los Angeles. Their store was financed by a minority bank.

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Because the money deposited in minority banks helps finance a lot of important things. Like new and renovated housing, small business loans and various improvements in the community.

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Except they strive to keep the money circulating *inside* the inner city where it works for the inner city people. And maybe more important, they speak the right language—whether it's "Soul" or Spanish—to people who might never have had much opportunity to talk to a banker before.

But money can be hard to come by in the inner city and we urge other businesses to help minority banks with regular deposits. Because sometimes it's nice to build things—besides interest.

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Given its natural ingredients, its packaging benefits and its environmental virtues, it's no wonder that consumer preference for glass containers continues to grow. For a copy of "The glass container story," write: Glass Container Manufacturers Institute, Dept. C, 1800 K St., N.W., Washington, D.C. 20006.

Glass. It's a natural.

Dressed for action, Taras Kiceniuk jr. gets ready to fly but not in the stripped glider (left, rear).

Takeoff consists of running hell-bent at edge of an ocean cliff while wearing the 54-pound glider.

By William Childress

It's a bird? It's Taras Kiceniuk!

This daring young man with a homemade glider leaps off California cliffs to put Darius Green to shame: Taras' flying machine actually works

When the 19th-century poet John Townsend Trowbridge wrote *Darius Green and His Flying Machine,* he couldn't possibly have had in mind a skinny, brown-haired 19-year-old from California. Or could he?

The hero of Trowbridge's poem, rather a reasonable facsimile, is alive and well atop Palomar Mountain, California. At least he was the last time I saw him loping heronlike across a meadow, harnessed to a pair of white wings.

Taras Kiceniuk jr. is as close to the Yankee youth whose barn-loft invention soared like a slab of granite as anyone we're apt to meet in this unromantic age. But there is a difference. Kiceniuk's glider is a pair of wings with no tail, made partly from Styrofoam and a polyester dress-lining fabric. And it flies. Once airborne, ungainly as a pregnant pelican, it breaks records that have stood since Otto Lilienthal, the 19th-century father of hang gliding, launched himself skyward from his 50-foot mound.

Kiceniuk was the reason my aging clunker labored toward the top of Palomar, where the famed observatory's four silvery domes stood against a clear, violet-tinged sky.

Taras, father of Taras junior, is an engineer and administrator for the Palomar Observatory. His home sits in a cover of trees within easy walking distance of the gigantic main dome. Parking, I headed for the house. In a clearing, tilted on one wing like a huge crippled moth, lay a glider bearing the words "ICARUS II." A young man with a file, thin as a stalk,

Hang glider is tailless, the swept-back wings with twin rudders providing stability.

Taras sits on a swing seat and controls his flight by shifting his weight against the harness.

hovered over it. "Are you Taras Kiceniuk?" I asked, "the one who flies that—er—craft?"

He glanced up. Brown eyes peered quizzically—and a bit vaguely—from under a shock of brown hair. "I'm one of 'em. Dad soars, too."

In earlier times, they'd have burned Taras at the stake. Even in this enlightened age there is something positively eerie about a five-foot-ten-inch human, weighing 146 pounds, running hell-for-leather with a pair of wings balanced by hands and shoulders. It's even more scary when, with a sudden rush, he's as airborne as an eagle.

"Oh, it takes a little practice. But ICARUS II is designed for tyros. I mean, how can you give dual instruction in a hang glider? Once you're ready—or feel you are—you trot to the edge of a cliff and hop off." He smiles. "Look at it this way: It can't be any more scary for us than it is for a baby bird whose wings aren't even *ready*, for god's sake."

All this chatter comes later, of course. Right now I'm walking around the tailless biplane, studying it carefully. Not that there is any need. There are some things a man knows without further research. And I know it'll never get off the ground. The young Caltech

Hurling himself into space, Taras takes off from the top of an oceanside cliff. Onshore winds, bouncing upward as they hit the shore, give him lift so he is often airborne before reaching the edge.

engineering student hands me a thick pamphlet entitled "ICARUS II Supplement, November 1972," and I light on a sentence: "To do this the craft is temporarily rigged with baling wire, cheap turnbuckles, and whatever."

Baling wire? My attitude suddenly changes. Gad, this is my kind of machine after all. If ever a panacea for human ills existed, it's baling wire. The Okie farmboy in me fairly cries out to that baling wire. I am disappointed to find the measure is only temporary.

Taras describes his most recent world record for foot-launched gliding. "I was flying ICARUS II," he says almost casually. "I was about 2,000 feet above the ground before I knew it. When you're up that high, swinging by your armpits, with nothing but a couple of straps holding you to an aluminum frame, you figure you might as well go for broke. So I stayed up as long as I could—which turned out to be almost two-and-a-half hours. Man, it got lonesome! The only sound you hear up there is the wind in the wires. Matter of fact, that's how I detect changes in speed; the higher the vibration the faster I'm going."

"Isn't it scary, flying this thing?"

"Nope."

"No parachute?"

"Nope."

Wiping the sweat off his nose, he tugs thoughtfully at an earlobe. "Come to think of it, I have added a seat," he says, and points to a rectangular board the size and shape of a kid's swing. Closer inspection reveals it is a kid's swing. "I didn't have it bolted in at first. Then one day it zipped out from under me. I figured that somebody could get brained on the ground, so now it's fastened to the harness."

His bean-bright eyes study me. He shakes his head. "You shoulda been around when ICARUS I was flying. Now *those* were the days." ICARUS I, Hang Glider Emeritus, first lofted young Taras skyward in 1971. It almost launched him earthward as well. "She had a few flaws," he said. "Once after a short flight a friend of mine swooped in for a landing, easy as pie, and the left wing folded up. Well, not actually *folded* but he got a nasty tumble out of it and a long session with rubbing alcohol. That can't happen with ICARUS II; I've made everything much stronger."

Before building hang gliders, Taras flew Rogallo kites, bamboo creations which performed erratically and which have injured people. But it enabled him to firm up his own thinking and create a design which is putting him through college via the sale ($10) of its

William Childress, a California free-lance writer, described William Lear's steam propulsion system of automobiles in SMITHSONIAN, *June 1973.*

"You have ruined my Volaille"

How Dione Lucas (of Cordon Bleu fame) came to create the most remarkable knife in the world. A knife you can now own.

Not an inexpensive knife.

I am told by my friends who pride their cooking, that this is just that—a remarkable knife that brings a new celebration to cooking. Its balance is such, its blade so acute, that with a small flick, you can pare fat from the shank of meat.

That, some remember, is exactly how gourmet great, Dione Lucas, came to create this remarkable knife.

Her recipe for Supreme de Volaille called for carefully removing all the fat from the tender meat.

A trace of fat would cause the sauce supreme to spot. "You have ruined my Volaille," she said. For no knife satisfied her with its truth of edge.

It is completely within the bounds of safety to say that once you own the Dione Lucas Gourmet Knife, you may never again have to purchase a knife for your kitchen.

In fact, that is the way we guarantee these remarkable knives. Should you ever need a replacement for any reason, simply return the knife, and a new knife will be sent to you, at no cost to you.

How can such confidence be placed in what would appear to be a simple knife?

A most special steel of molybdenum mix is used in the manufacture of the blade. This blade keeps its edge for life with simple honing.

Then there is the balance I spoke of. When you lift the knife, you will note it is lighter than an ordinary knife. This is because the knife is so perfectly balanced, that it does not need added weight to help it cut! This balance, in your hand, makes possible an accuracy of cut you have never before known. A certainty of cut quite unique in any cooking experience you may have had.

I make no pretense of low price for this knife. It is not, by any means, the world's most inexpensive knife set. Yet when you consider it as a lifetime investment, its value takes real meaning.

A set of 4 of these knives is $14.98.

Were it to be sold for less, the very qualities that make this knife so supreme, would have to be lessened.

And these knives have been subjected to extreme tests to assure their quality.

A one pound ball has been dropped on this from 6 feet to test the strength of the Rosewood handle.

A weight of 20 pounds was suspended on the blade to test its tensile strength.

A ham bone was used in extensive tests to determine the resistance of the blade to nicking.

In every case, the quality of this remarkable Dione Lucas knife stood firm.

There are four knives in the set. One of 8½" for vegetable paring. One of 11½" for the wafer thin slicing of bread and such. One of 14¼" for the carving of roasts. And a cleaver of 11" for the separation of chickens and such.

Because this is such a unique ownership, I am including with each set of these knives, four recipes of Cordon Bleu teacher, Dione Lucas, where the use of her knives is quite critical to the outcome of the recipe. (Including her recipe for Supreme de Volaille.)

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plans. In high school, he also built a slim, sleek racing yawl. It, too, lies canvas-covered in the shed which serves as graveyard for a number of contraptions.

"But my all-time favorite has to be *that,*" he says, pointing to a railroad handcar.

"You stole a handcar?" I ask suspiciously.

"We *made* one. Me and a buddy. It's only half as heavy as a standard railroad version, and it will really scoot. We'd take it out in the dead of night—we named her *The Midnight Flyer*—put it on the Santa Fe tracks and just take off. It got to where the cops knew we were coming and would stop us. We finally learned to act arrogant, like we worked for Santa Fe, and they left us alone."

Outside, Taras' little sister is quietly hosing off ICARUS II, before taking it apart, packing it in the long, narrow car-top container and driving it to the launching site. Taras explains that ocean cliffs are the best for takeoffs. He flies mostly at Corona del Mar or Torrey Pines. "It's a matter of heading into the wind," he says, "for both takeoffs and landings. Run up to a cliff and just drop off—hell, you're already airborne practically before you jump."

Otto Lilienthal is considered the real father of gliding, Taras tells me, though there were important contributors before him. He began flying gliders in the 1860s and he built the first successful hang gliders. The Smithsonian Institution is presently restoring one.

Following Lilienthal, Octave Chanute, at the age of 64, began experimenting with gliders. He introduced the Pratt truss—formerly used in bridge-building—which consists of vertical struts with diagonal bracing wires, much as I saw on Taras' ICARUS II. His aircraft were so stable—Taras reminds me that Chanute made at least 2,000 flights without one crack-up—that the Wright brothers employed some of his methods on their own gliders. Even after Kitty Hawk, the Wright brothers continued to fly gliders, all of them strengthened by the Pratt truss.

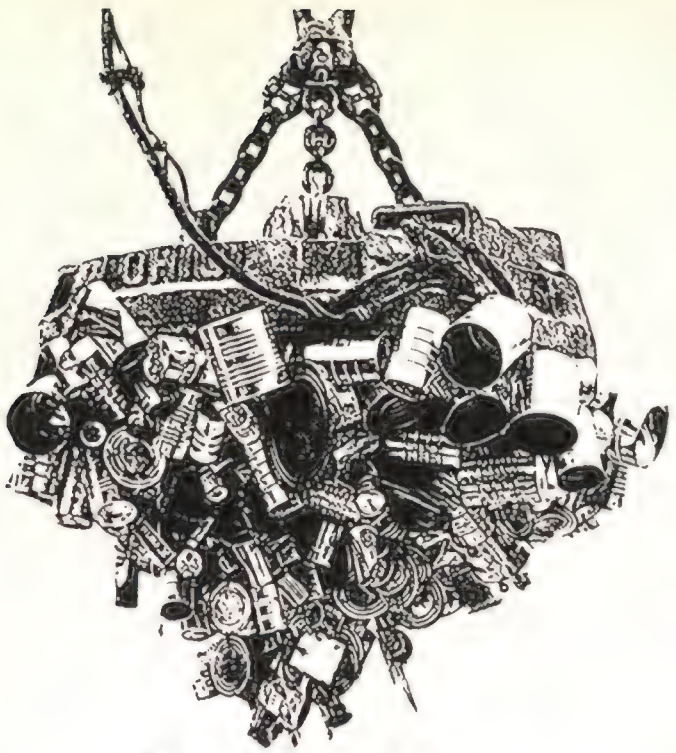
Taras shows me how to put the glider on, if that's the phrase. Stepping into the midwing slot, he adjusts a parachute-type harness, then indicates how light the craft is by stooping and lifting it. The wings droop. The cables squeak.

"It weighs only 54 pounds. Once you start running, the weight just disappears. It supports itself almost instantly and very soon is lifting you off the ground." He looks momentarily somber. "I guess what I'm afraid of is that hang gliding will become a fad. Then big business. Already there are people coming to meets, making businessmen's noises. One outfit already makes what it calls a hang glider. It's worth your life to fly it."

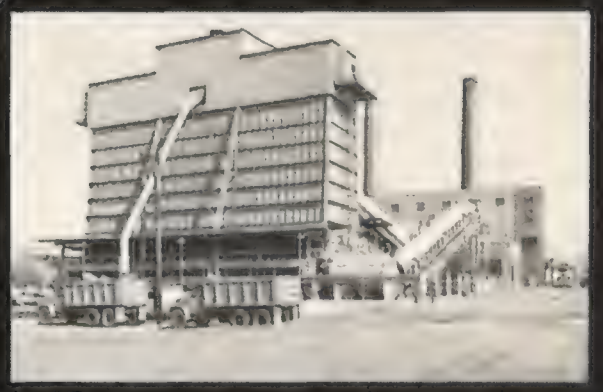
He smiles again. "But one thing's for sure—it's a *kick* to hang glide. You're all alone up there, not enclosed in a cockpit like you are in a sailplane, but out in the open. That has to be the closest thing to bird flight. It *has* to be. Just you and the wind in the wires."

To land, Taras swings off his seat and lowers his landing gear—a pair of husky legs.

Use of rising air currents enables him to soar for a hang glider record of two-and-a-half hours.



St. Louis Converts Garbage Into Energy



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*St. Louis Solid Waste Demonstration Project is funded and operated by U.S. Environmental Protection Agency, City of St. Louis, Union Electric Company, and American Iron and Steel Institute.

An officer of Oglethorpe's Georgia Regiment (the 42nd Foot) parades diffidently with his lady in 1739.

She wears a long outmoded Queen Anne dress—typical in colonies where European fashions arrived late.

In patched regimentals, an officer of the 4th Pennsylvania escorts his lady during the dark days of 1779.

Drawings and article by Peter F. Copeland

Our ancestors as fashion plates

From early colonial times, military uniforms of our forefathers developed side by side with the high fashions of our distant matriarchs

It is reported that Maurice de Saxe, Louis XV's German marshal of France, remarked as he lay upon his deathbed, "Life, Doctor, is but a dream, and I've had a fine one!" A good portion of the dream of this military genius—aside from the wine and women with which he indulged himself in prodigious quantities—was involved in the design of military uniforms. In his remarkable little book, *Reveries on the Art of War* (1757), Saxe railed against the ridiculous military fashions of his period, and spent a good deal of time designing an infantry uniform surprisingly like the type adopted by the armies of Europe some 150 years later.

His labors, of course, were in vain. Aside from his own household regiment, which he maintained under strict discipline on his private estate, the retired mar-

Their finery is threadbare, thanks to the Revolution, but elegant beside the rags of common soldiers.

Dashing colonel of marines, garbed Napoleonically, struts beside his true love in 1812. She wears the simple, Greek-inspired fashion—high waistline and draped fabric—that marked the early 19th century.

shal of all the armies of France was unable to effect a change in the military dress of his time.

The frivolities and vanities of feminine costume in the 18th and early 19th centuries are well known. Hogarth, Gillray, Rowlandson and many others made much of them in lampoons and caricatures, but American ladies dutifully copied their sisters abroad. Equally absurd were the affectations of military dress. Today soldiers go about their work in combat dress resembling the garments of garbage men. How quaint, then, is the foppery affected by regiments in bygone days.

Early military uniforms imitated the fashions of the aristocracy—an important factor in the success of 18th-century recruiting parties. A fancy cocked hat with button loop and cockade, a fine regimental coat with lapels and buttonholes often bound in ornately designed gold or silver lace, tight knee breeches, stockings and buckled shoes, brass-hilted sword—all these were items that the average peasant lad could never hope to afford. They were a long way from his own mean garments. To such a boy, a soldier's life must have seemed a fine one indeed.

Regular regimental uniforms began to make their appearance in Europe in the late 17th century, but officers often refused to wear them. They considered it demeaning for a gentleman to wear any man's livery, even the king's. Naval uniforms, for officers at least, did not appear until sometime later, and then were patterned on the dress of army officers. Naval enlisted men had no uniforms until well into the 19th century.

Connecticut Yankee of 1830 poses with his wife on militia muster day. Brass plate on rooster-plumed hat designates the Burlington company. His spouse in a coarse linen apron seems aware his canteen holds rum.

Naval engineer of 1848 takes his wife to local church, of which she is obviously a pillar. Her redingote

There was some connection between the affectations of female dress and the design of military uniforms. The first uniform for officers of Britain's navy was decided upon by King George II in 1748. According to one tale, his Majesty had selected a blue uniform faced with white for naval officers after having seen the Duchess of Bedford riding in Hyde Park wearing a handsome habit done up in those colors. This decision may, of course, have been prompted less by the habit that the duchess wore than by the way she wore it. And this might lead one into an intriguing conjecture concerning the relationship between duchess and king which would not be germane.

Before the advent of an officially prescribed dress, it seems that many officers of the British fleet wore fanciful uniforms of their own devising. A story is told about Captain William Burnaby, an accomplished fop, who joined Admiral Edward Vernon in the West Indies in 1741. Upon announcing himself to the crusty (and somewhat slovenly) old admiral as commander of a bomb vessel just arrived from England, Vernon observed, eyeing him up and down, "Gad, sir, I really took you for a dancing master!"

The frivolity of military dress is well illustrated in the problems of the gentlemen of horse regiments in the closing years of the 17th century. Cavalrymen of those days wore huge periwigs, ornately curled, reaching to their shoulders, upon which was fixed (by means of a hatpin) a large hat with feathers, sometimes cocked up on three sides, sometimes only on one. After a thundering cavalry charge, the battlefield would be littered with flowing wigs with feathered hats fastened

Former merchant seaman Pete Copeland is chief illustrator of the Smithsonian's Air and Space Museum. He is preparing a book on colonial work dress.

gown matches his somber uniform. Both reflect sobriety of the age, when Victorianism swept America.

Weighted down with weaponry, a captain of Virginia cavalry defies the damyankees. His lady, despite ribbons, bows and heavy brocade, remains demure. His insignia proclaims Co. A, White's Battalion.

to them. Presumably, shaven-headed gentlemen of horse would spend the evening (if they had won) searching the smoldering turf for their headpieces.

Soldier dress tended to be somewhat international, for the armies of Europe often aped one another. They would adopt peculiarities of dress especially devised for some specific purpose, as in the case of the grenadier cap. Originally designed for a picked body of men whose duty it was to hurl grenades, the tall, brimless grenadier cap allowed a man to sling his musket and throw his bomb without knocking it off. As with many such utilitarian ideas, however, the cap soon became more and more exaggerated in size and less and less functional. It finally evolved as the absurd and towering bearskin cap of the 19th century.

Another example of this tendency to transform a practical military item into a travesty of uselessness is the hussar uniform. Hussars were originally companies of Hungarian irregular light horse. They caught the imagination of all of Europe, and by the late 18th century many nations had raised regiments dressed in the colorful Hungarian outfit. And gradually the elements of this uniform became so stylized as to be useless, indeed an impediment, in combat.

The small, fur-trimmed horseman's cap became an unwieldy high-crowned fur busby. The crown of the cap grew into a ridiculously long, tasseled appendage which flapped about the wearer's waist. The short fur-trimmed jacket turned into the pelisse, a garment so made that it was impossible to wear. It could only be slung over the shoulder by a cord—pretty perhaps, but also foolish and cumbersome. The sabretache, originally a dispatch case hung from a belt, became a purposeless encumbrance that dangled about a hussar's ankles when he dismounted. His breeches became so tight that he could not mount his horse without aid.

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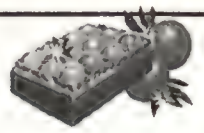

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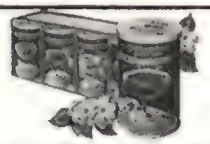

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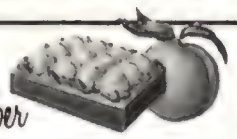

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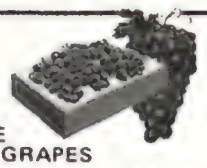

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Continued from p. 107

Although in many ways colonial Americans differed from Europeans, in the field of fashionable dress they slavishly copied their cousins across the sea. Countrymen and pioneers wore Indian moccasins and buckskin breeches, but ladies and gentlemen from Boston to Savannah ordered well-cut garments from London tailors whenever they were able.

In their military dress, too, Americans generally imitated European uniforms. Officers strove for the sort of smartness that they so admired in the soldiers of the king, but in colonial days and in the American Revolution the common soldier often got no uniform at all—only a musket and cartridge box and, if he were lucky, a blanket.

"Rheumatics" from wet pipe clay

When in the early 1770s, white smallclothes (vest and breeches) became part of the soldiers' dress, great labors were undertaken to whiten garments that had become dirty and stained. Aching joints were a common complaint as a result of troops having to spend the greater part of each day in wet clothing in the name of military smartness. Smallclothes were bleached with pipe clay and water; leather crossbelts were vigorously whitened with pipe clay; the soldier's hair was combed with lard or tallow, whitened with a dusting of rancid flour, curled at the side and tied behind.

During the Revolution, despite shortages of every kind, the habit continued. A contemporary description of a Continental Army regiment noted men clad for the most part in rags, many without shoes, but all with hair meticulously curled, tied and whitened with flour.

In Continental regiments the "hunting shirt," or rifle shirt, often became the coat of the soldier. This was the common garment of the farmer, laborer and wagoner: a long, full shirt of coarse canvas linen, usually pulled over the head and reaching to the knee. These plebian garments were given a military connotation by dyeing them, with cuffs and collars a different color from the shirts.

The American officer, whenever he was able, got himself up to emulate European smartness, sporting plumes, epaulets, sashes, lace and gorgets. Affectations of foppery were practiced so widely that

Can You Answer These Questions About Writing Your Will?*

TRUE or FALSE

Mark each of the following statements T for True, or F for False, in the box at its right. For correct answers, see panel below.

1 — If you do not have a Will and therefore die "intestate," state law will give your wife all of your Estate. ☐

2 — If you die "intestate" while your children are minors, state law will divide a third of your Estate among them. ☐

3 — When you leave no Will, the state automatically appoints a social worker and a bank as guardians of your minor children. ☐

4 — Whoever is appointed guardian for your minor children has complete say-so in taking care of them and their affairs. ☐

5 — Lacking a Will, your property will be disposed of more or less as your Will would have directed. ☐

6 — Children not mentioned in your Will are excluded from an inheritance. ☐

7 — A husband has the same rights to his wife's Estate as she has to his. ☐

8 — A handwritten Will, unwitnessed, cannot be valid. ☐

9 — Wills never require more than two witnesses. ☐

10 — It is expensive to have a lawyer draw up your Will. ☐

ANSWERS

1 — False. Usually not. In some states, your wife gets one-third if you die without a Will.

2 — False. Many states give two-thirds of your Estate to your children equally divided among them.

3 — False. It is more likely to appoint your spouse as guardian, or some other person. But they will have to furnish a bond and pay the fee for it.

4 — False. Even if your wife is guardian, she usually must have specific permission from the court to spend your children's share of your Estate on their support or education. She may be required to render detailed accounts of these expenditures.

5 — False. Your property would be disposed of according to the law of your state and not necessarily as you would have directed.

6 — False. A child born after the date of your Will might be entitled to receive whatever would have been provided by the state if you had died "intestate."

7 — False. This is not always the case.

8 — False. In some states, when the handwriting is generally known, handwritten Wills can be held valid, but questions about the circumstances under which they were written make them a very risky proposition.

9 — False. Some states may require three. Any Will disposing of property located in a three-witness state should have three, even if you write it while resident in a state requiring only two.

10 — False. Actually, it is usually a very modest amount. Whatever his charge, the expert knowledge involved makes it a bargain.

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Uniforms and fashions

Continued from page 108

George Rogers Clark reportedly once ordered a sedan chair so that he might be sedately borne in the manner of a gentleman through the forests and swamps of Illinois and Ohio.

The most distinctive costume features of a lady of fashion at this time were her headdress and skirt. By 1770 headdresses had assumed truly alarming proportions. Supported by crinkled crinoline, false hair and wire frames and fantastically decorated, they had achieved such lofty heights that a hairdresser would be forced to ascend a ladder to finish off a coiffure. Plastered with pomade and flour paste, these towering creations were often topped with such figures as a ship under full sail, or the Battle of Bunker Hill, and they became such a nest of parasites that ladies used slim jeweled rods to scratch themselves without disarranging their headpieces.

Fifty years before the Revolution the hoopskirt returned. Hoops, made usually of cane or whalebone, swelled skirts from waist to ankle to such a degree that it became difficult for a lady to navigate through a doorway. Then came elliptical hoops, which further increased the width of the skirt to the point where one could not proceed through a room without considerable disarrangment of furniture. A lady had to be a very marvel of intrepidity; her lofty coiffure swayed perilously close to the candles of the chandelier, while her enormous skirts set end tables and chiffoniers atottering. Presumably the train of her dress collected the wreckage.

Imagine her upon the arm of a gallant officer whose bespangled regimental coat, worn fashionably open, is cut to flare gen-

erously outward at the hips. His large cocked hat nods with plumes, his hands are almost concealed beneath cascades of ruffled linen. His dainty small sword dangles about his thigh, and his absurdly trailing coat cuffs constantly threaten the tea cups—and the composure of his hostess.

By 1812 enormously high collars had come into military fashion, together with the preposterous *chapeau bras,* the fore-and-aft cocked hat favored by Napoleon and thereafter much exaggerated in size and festooned with plumes. This was adopted by naval as well as army officers. Picture an admiral navigating himself out of a bobbing whaleboat, up a Jacob's ladder and over the bulwarks of a man-o'-war while wearing this overpowering headpiece. Soldiers at this time wore a bell-crowned leather shako with a worsted pompom at the front.

Feminine dress, meanwhile, affected dramatic changes. Hoopskirts and headpieces gave way to the classic simplicity of ancient Greece. The dress became a straight sheath with low, square neckline and short sleeves. It was belted or gathered just under the breasts in a simple but elegant fashion—if the lady had the figure for it. In the 1820s there was a fashionable enthusiasm for military details. Froggings and epaulets began to appear in ladies' wardrobes, along with Wellington hoods and mantles.

Next, dresses began to spread again from hips to ankles as hoopskirt fashion returned. By the 1850s, skirts had resumed their enormous breadth, but the modesty and sobriety of the Victorian era rendered the styles far more somber and dismally chaste than in the 18th century. As this unfortunate fashion progressed, ladies

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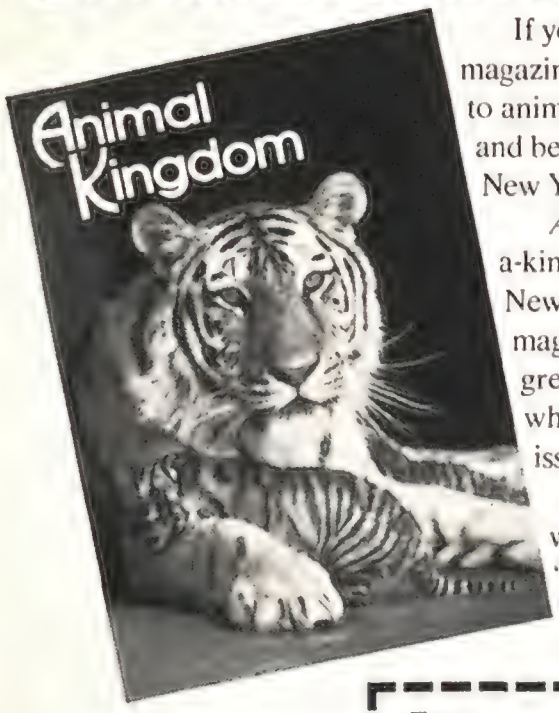

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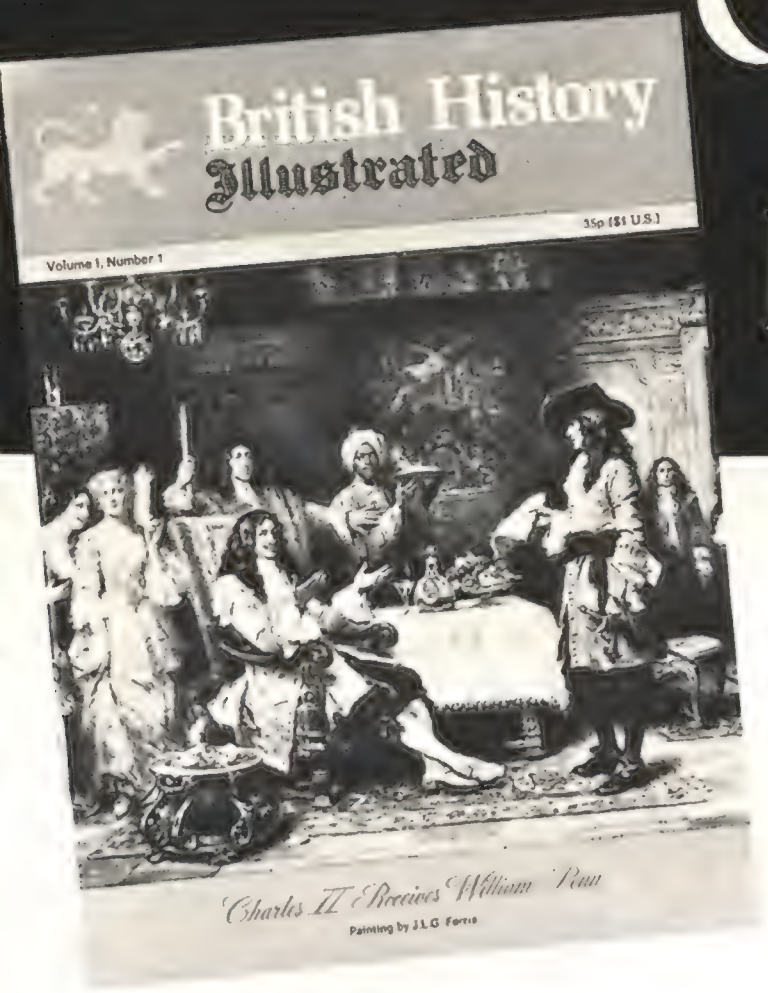
were so bundled in padded petticoats, heavy skirts and bustles that the charms of the most shapely were entirely submerged. This, Victorians felt, was as it should be.

By mid-19th century, too, the gaudy plumes and ornate laced coats of 18th-century soldiery had disappeared, except for a reminder in the elegant and aristocratic "silk-stocking" companies of some large Eastern cities. Trousers had emerged triumphant in civilian male fashion, and soldiers were appearing in "pantaloons," though some officers clung to knee breeches until well into the 19th century.

Wars have always had a practical effect upon uniforms, making them less ornate, looser in fit, more comfortable. "Mad Anthony" Wayne, known for his neatness among Revolutionary War officers, wore a rusty red coat when he commanded at Fort Ticonderoga in 1777. Zachary Taylor led his men into the Mexican War in the 1840s dressed in a hickory shirt, a plain sackcloth coat and a straw hat. Ulysses S. Grant favored private's dress, devoid of braid and tinsel, and an old slouch hat.

Also, amusingly, nations tend to copy the uniforms of other countries that have been recent victors in whatever conflicts have been raging. Both Union and Confederate troops went into the Civil War in uniforms copied from the French, for during the Second Empire of Napoleon III France was considered Europe's most powerful nation. But when Napoleon III was defeated by the Prussians in 1870-71, Americans dutifully adopted Prussian-style uniforms, even to the spiked helmets. Similarly, at the end of World War II, many Western nations picked up Britain's battle dress or America's Eisenhower jacket, while Communist countries all wore a variation of the Soviet uniform.

Cheers to the Bloke in the Black Bowler Hat



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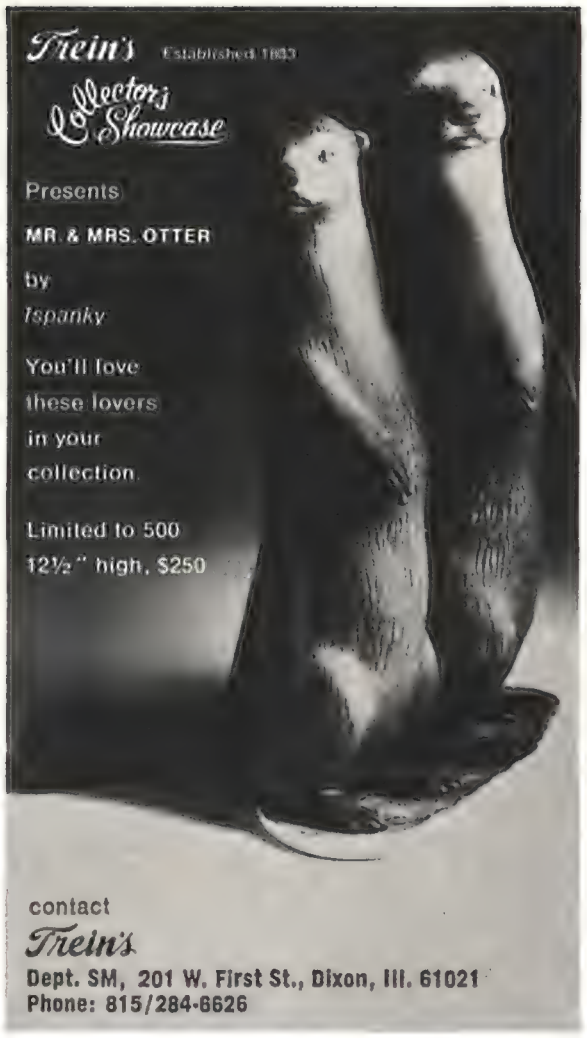

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Book reviews

Rube Goldberg
Peter C. Marzio
(Harper & Row, $10)

I first met Rube Goldberg in 1942 when I was a hopeful 20-year-old cartoonist from New Mexico in an army uniform, on furlough in New York. Hoping to collect an armload of "originals" from established cartoonists, I settled down in a phone booth with a fistful of nickels and went through the Manhattan directory without finding a single great name in my chosen profession except that of Goldberg. I had never heard of unlisted numbers and he didn't believe in them.

Rube answered the phone himself, met me at the door of his posh studio (the elevator man wore a wing collar and white tie), gave me an hour of his time, and sent me away with an original drawing of one of the inventions for which he is best known. It remains my most prized possession.

Later I saw him several times after joining the National Cartoonists Society, over which he reigned from its start in 1946 until his death in 1970. The Society's "Oscar," awarded annually, is called the "Reuben," which shows the esteem in which Goldberg was held.

Political disagreement between us was total. He admired Joe McCarthy and thought that Herblock and I were too "bitter," and took a "vicious" view of things. Like true professionals, Rube and I didn't let this mess up our drinking relationship, which I valued as highly as that yellowing old original.

Biographies and autobiographies of cartoonists usually suffer from the fact that their subjects are in a grinding pro-

fession whose daily demands leave them little time or energy to be colorful. Happily, Rube managed not to be a drudge, despite his lifetime output of 50,000 cartoons. To give an idea of his working span, his last political cartoons were for Hearst's New York *Journal-American* in 1964 and some of his earliest stuff was burned in 1906 in the San Francisco fire.

Goldberg was a high liver and a big name when syndicated newspaper cartoon characters were the TV superstars of their times, and he ran with the likes of Will Rogers, Ring Lardner, F. Scott Fitzgerald and Irving Berlin—to say nothing of other celebrated cartoonists. In fact, I learned from this book that Rube practically invented the syndicate, in cahoots with a Scot with the Goldbergian name of Virgil McNitt, and for decades pulled down a paycheck higher than that of most corporation presidents of the day.

All of this and a lot more is contained in Peter Marzio's affectionate, rollicking and thorough study. We get an early clue to Rube's robust character when he joins the San Francisco *Chronicle*'s art department as a rookie, takes what he regards as an adequate amount of hazing, then nails everybody's desk top down before a deadline and has no further trouble.

He was successful early and the rest of his career could be described as cluttered with successes. Even Rube's last enterprise, sculpture (SMITHSONIAN, November 1970), was taken pretty seriously by the critics. So if you think of Goldberg simply as the guy who drew all those crazy inventions, such as the one on how to get the cotton out of an aspirin bottle, read this biography and enlarge your view.
—Bill Mauldin
Pulitzer prize-winning cartoonist and recipient of a "Reuben"

Winner Lose All
Dr. Cook and the Theft of the North Pole
Hugh Eames
(Little, Brown, $8.95)

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discoverer of the North Pole by most geographers, encyclopedias and almanacs for more than half a century.

Only elderly readers of periodicals may remember that Peary returned from his expedition of 1908-1909 to find himself at the center of a controversy, faced by a rival who claimed that he had reached the North Pole nearly a year before.

Did Peary really reach it? What of Dr. Frederick A. Cook? In these two new books, Mr. Eames and Mr. Rawlins have carefully considered these and other questions, and each has earnestly striven to demolish Peary and his claim. Though these are by no means the first books to contradict Peary, their simultaneous appearance in 1973 to renew the old controversy is something of a coincidence.

When Cook and Peary made their respective dashes toward the North Pole at the beginning of this century, few areas of the Earth remained unexplored. Clearly, the conquest of the North Pole offered a formidable challenge to adventurous men.

Peary and Cook were not alone in their fascination with the frozen ends of the Earth. Such explorers as Fridtjof Nansen, Vilhjalmur Stefansson and Roald Amundsen were all seasoned veterans of Arctic or Antarctic expeditions, capable of mounting potentially successful thrusts at the North Pole. The public and the newspapers sensed the air of competition and interest ran high in 1908-09.

That interest was furthered by the difference between the two American expeditions. Cook was nearly unknown; Peary was already a giant of the north and had behind him great institutions, including the United States Navy and the National Geographic Society. Cook disappeared toward the Pole with two Eskimos; Peary marched much of the way with a large, well-organized expedition.

Cook reappeared first, claiming to have reached the Pole on April 21, 1908. Five days later, Peary announced that he had claimed the Pole for America on April 6, 1909. The argument was brief—within five months Peary's powerful supporters had demolished Cook's claim (which was compromised by his subsequent brush with the law on other matters), and Peary was crowned king of the north.

Who was really first? Mr. Eames champions the much-abused Cook. Mr. Rawlins, while denying Peary's claim, also dismisses Cook's. It is even possible that the first men actually to reach the North

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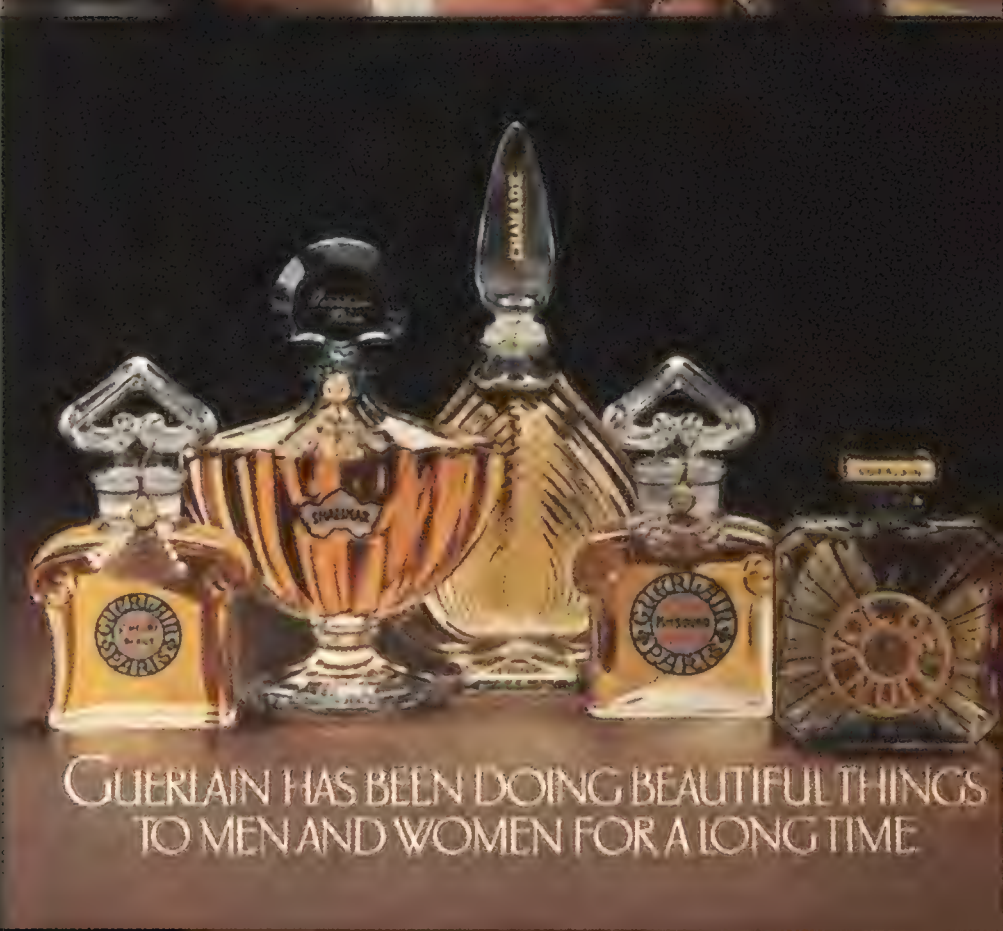
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Pole on the surface were Minnesotan Ralph Plaisted and his team of Canadian-American snowmobilers, who accomplished the feat on April 19, 1968.

These two well-documented, carefully thought-out books are recommended to anyone who would like to consider the controversy further.

—Alexis Doster III
Assistant Curator, National Air and Space Museum, student of naval history

Theories of Man and Culture
Elvin Hatch
(Columbia University Press, $12.50)

"One of the most basic words to understand in 20th-century anthropology is *culture,*" declares Elvin Hatch on the first page of his introductory essay. He goes on to tell us: "To some, culture is a finely tuned instrument which serves man's material needs," while to others culture "is virtually autonomous from the exigencies of life. . . ." It is the purpose of his book to show how the word has been interpreted by ten anthropologists—one, E. B. Taylor, a typical intellectual of the late Victorian era, the rest by 20th-century investigators and theorists. Those who enjoy reading anthropology books will not be disturbed by the wide differences of opinion and interpretation to be found among the ten writers. Others who have strong prejudices in favor of what they consider empirical or "exact" science will have their prejudices fortified.

It is understandable that so young a field of study should still remain controversial. Still, one is struck by the differences displayed. Some believe that only a subjective view of man can make sense out of his institutions while others believe that institutions shape man. For instance, E. E. Evans-Pritchard, a Roman Catholic, was convinced that each individual is responsible for himself (free will) and wrote, "sociological determinism and the teachings of Jesus are irreconcilable." His *bête noire,* R. R. Radcliffe-Brown, insisted that it was institutions that adapted man to society, because institutions promote stability and cohesion. For Franz Boas, the all-over pattern of cultural ideas and behavior causes the individual's personal aims to recede into the background as automatically as an automobile driver's unconscious habit of depressing the clutch pedal before shifting gears. Bronislaw Malinowski would

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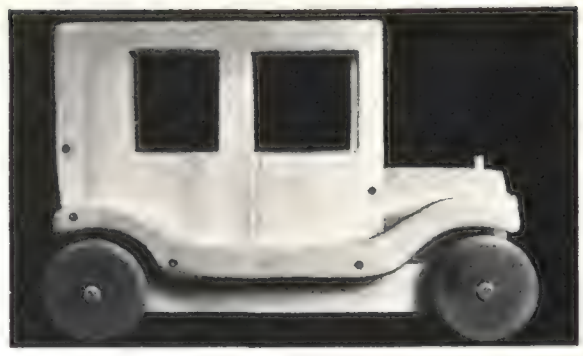

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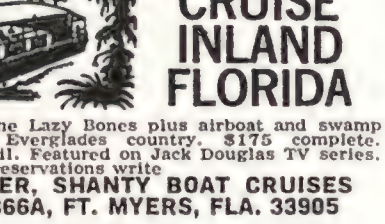

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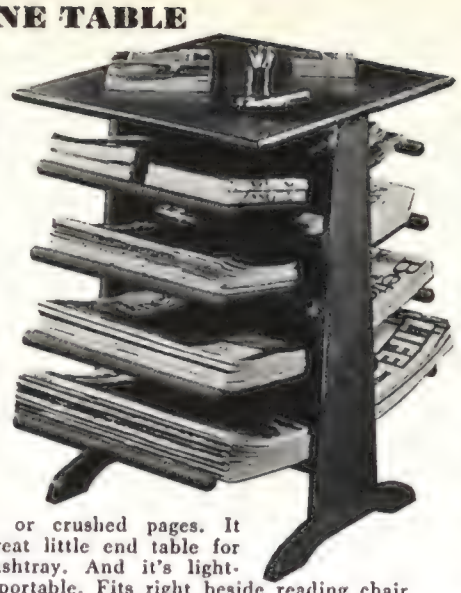

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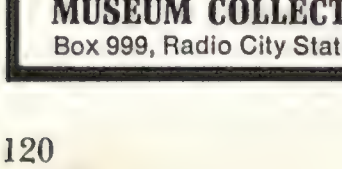

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have none of this. The car driver, he argues, is interested in *where* he is going and *how* to control the automobile.

It is, of course, their gathering and analyses of material from various countries and climates that makes some anthropologists' books such good reading. Ruth Benedict's descriptions of Northwest Coast Indian potlatches, Malinowski's accounts of gardening and sexuality in the Trobriand Islands or Emile Durkheim's aboriginal Australians will interest readers for years; they are full of human insight and poetry.

The status of anthropology depends on the refining of the arguments as to what "culture" is. Since there are few primitive people left to study anywhere in the world, perhaps anthropology will take its place simply as an aspect of the writing of history. Mr. Hatch—an assistant professor of anthropology at the University of California, Santa Barbara—has done a conscientious job in keeping his readers up-to-date. Further, his enthusiasm for the subject makes us want to get *Patterns of Culture* or *The Golden Bough* or *The Savage Mind* down from our shelves and read them once again.

—John Bernard Myers
New York essayist, former editor of *View*

Mark Twain: God's Fool
Hamlin Hill
(Harper & Row, $10)

In 1926, Albert Bigelow Paine, Mark Twain's official biographer, wrote to Harper & Brothers, Twain's publishers: "I think on general principles it is a mistake to let any one else write about Mark Twain, as long as we can prevent it. . . . As soon as this is begun . . . the Mark Twain that we have 'preserved'—the Mark Twain that we knew, the traditional Mark Twain—will begin to fade . . . and with that process the Harper Mark Twain property will depreciate."

Paine was not the first literary biographer to "cover up" for his subject. Neither was Clara Clemens, Twain's surviving daughter, who whitewashed the reputation of an eminent man, even to the extent of suppressing his manuscript of "Letters from the Earth," (eventually published by Harper & Row, 1962). In this book, purporting to be the devil's view of this planet, his cynicism and agnosticism were evident.

Paine confessed that Twain had inher-

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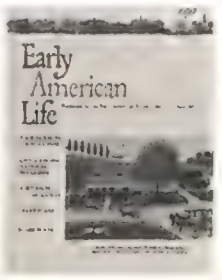

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ited along with his strength "the weaknesses of our kind," but the facts of the matter were quite beyond the scope of platitude. Clara recognized that her father had had a secretary-housekeeper and a business manager but deleted their names from the papers that came into her hands. A Twain legend almost as immaculate as the subject's white cashmere suits was preserved nearly intact until the time of Clara's death in 1962.

Hamlin Hill, a professor of English and a Twain scholar, following Justin Kaplan's *Mr. Clemens and Mark Twain* (Simon & Schuster, 1966), has had the recent advantage of working through a mass of unpublished material, including the diaries of Twain's secretary, Isabel Lyon, now available among The Mark Twain Papers, Bancroft Library, the University of California, Berkeley. The result in *Mark Twain: God's Fool* is to show that the last decade of Twain's life was marred by acrimonious business relations, extraordinary family tensions—the nervous collapse and death of his wife, the persistent illness of his two daughters (including the death of the younger through drowning in her bath during an epileptic seizure), his own decline in health and a multitude of other aggravations.

In the last decade of his life his inner restlessness failed to dissipate itself in creative work. Though he was at the height of his fame in the first decade of the 20th century, the new century was not for Twain. It presented a series of problems daunting to a man who had already done his best work. Twain wrote, of course, sometimes prodigiously, but on the whole the decade was squandered in crisis or in triviality—in frequently moving from house to house, in the receipt of innumerable honors, in business ventures that produced no profit, in abortive literary schemes, in visiting and being visited, in billiards and cards.

The passage of time did not mellow Twain. His attitude toward his children—daughter Jean signed the guest book in his house—and his brutal treatment of Isabel Lyon are part of Twain's decline. Professor Hill's narrative is for the most part a clean-cut account of this sad time, although he sometimes works the material unnecessarily for effect. The man Twain is there—and he bleeds.

—*Gene Baro*

Mr. Baro, poet and critic, writes and lectures on American cultural subjects

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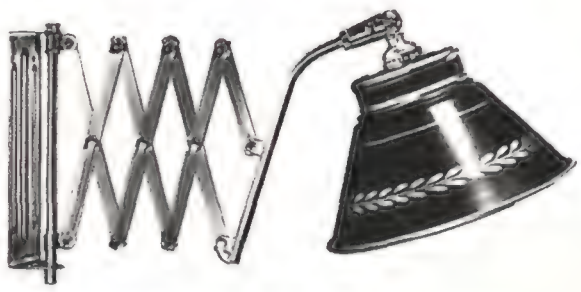

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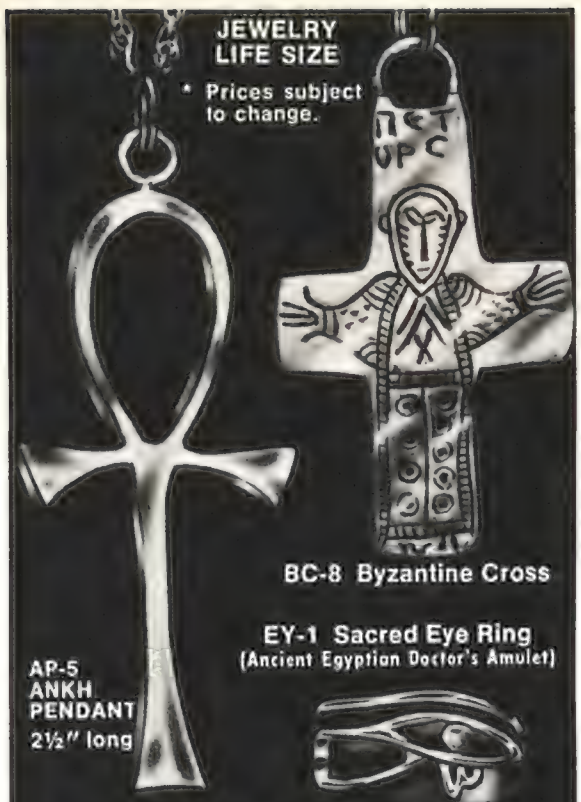

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Puppet Theater
"Patchwork," a new puppet show presented by Allan Stevens and Company, is an original anthology of children's songs, poems and stories performed in the Puppet Theater in the Arts and Industries Building on Wednesdays, Thursdays and Fridays at 10:30 and 11:30 A.M. and on Saturdays and Sundays at 11:30 A.M., 12:30 and 2:30 P.M. For ticket information call (202) 381-5395.

Performing Arts
For ticket information on the following events call (202) 381-5395.

"Perception Series Six" presents Earle Brown, the internationally recognized contemporary composer and conductor, in concert on October 19th in the Baird Auditorium, Natural History Building, at 8:00 P.M.

"Music from Marlboro" begins its ninth season of concerts with selections from Brahms and Schumann in the Baird Auditorium on October 20 at 5:30 P.M.

Smithsonian Speakers

The National Speakers Bureau is a service provided by Smithsonian Associates which offers an opportunity for organizations within the United States to request curators and other Smithsonian Staff members to lecture on a wide spectrum of disciplines. Travel and other expenses are paid by participating organizations. Write: National Speakers Bureau, Smithsonian Associates, Smithsonian Institution, SI 118, Washington, D.C. 20560.

National Portrait Gallery

"The Black Presence in the Era of the American Revolution, 1770-1800" is a major exhibition of 250 items, including portraits, prints, broadsides, petitions, poems and letters which demonstrate the influence of blacks in the founding of this country (see August SMITHSONIAN).

Anacostia Neighborhood Museum

"Africa: Three Out of Many" is an exhibition of cultural and religious artifacts, with masks, manuscripts, crosses and textiles from Ethiopia, Ghana and Nigeria displayed in three separate African huts.

Parking on the Mall

Metro construction has made parking on the Mall near the Smithsonian complex extremely difficult. All parking prior to 10 A.M. is restricted. The use of fringe parking areas and/or public transportation is recommended whenever possible. Current parking information may be obtained by writing to the Smithsonian Associates' Reception Center.

Freer Gallery of Art

"Chinese Figure Paintings" is the second of three shows planned to commemorate the 50th anniversary of the Freer Gallery. The exhibition consists of 59 Chinese paintings, ranging from the 10th to the 18th century.

"Turkish Art of the Ottoman Period" is a collection of miniature paintings, drawings, portraits, manuscript illuminations, bookbindings and ceramics. The exhibition commemorates the 50th anniversary of the Turkish Republic.

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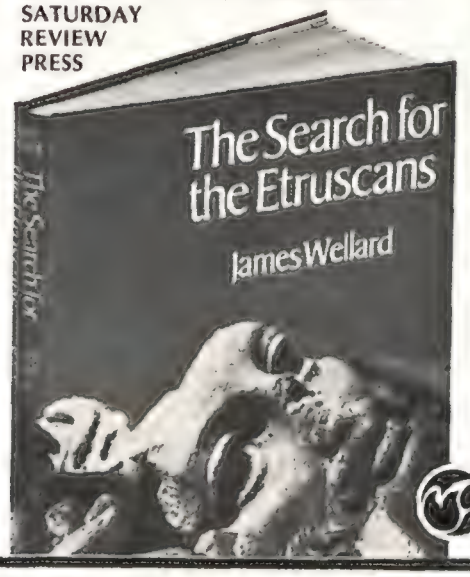

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DOMESTIC STUDY TOURS

Skylab Launch: View the launch of Skylab 4; tour NASA facilities at Cape Kennedy—late-October.

Sea and Shore Laboratory, Charlotte Harbor, Florida: Using the facilities of Mote Marine Lab, participate in current research problems; discover the low-tide shore life; cook out on an uninhabited island—October 11-18.

Big Cypress Swamp and Everglades National Park: Observe the fauna, flora and unique bird life of these two very different areas in southern Florida—November 11-18.

Louisiana Plantations: Tour the historic architecture and observe the processing of sugarcane; stay in plantation guesthouses—November 2-8.

Christmas at the Smithsonian: Enjoy a pre-opening look at new exhibits, dinner with Smithsonian leaders, shopping and an old-fashioned tree-trimming party. Limited to 150 persons—December 7-9.

Hawaiian Islands: Examine the mysterious ancient petroglyphs, visit the restored whaling village of Lahaina, relive history at the Bishop Museum ending with a traditional luau—January 1974.

Sturbridge Village, Massachusetts: A nostalgic winter weekend of sleigh rides, singing, square dancing and good food—January 25-27, 1974.

Baja California: Observe the gray whales, seals and sea lions from San Diego to Scammon Lagoon—February 4-11, 1974.

Mound Builders of Georgia: Trace the prehistoric mound-building cultures of Georgia by examining undeveloped sites, archaeological excavations and museums—February 17-23, 1974.

California: A study cruise of the Channel Islands—April 15-22, 1974.

San Antonio, Texas: Take part in an authentic Mexican fiesta—April 20-26, 1974.

FOREIGN STUDY TOURS

Copernicus' Poland and Italy: In this 500th anniversary of Copernicus' birth, visit the scenes of his life in Krakow, Frombork, Torun, Warsaw, Bologna and Padua—October 1-21.

West Africa: Historic sites from Mali to Senegal—January 8-February 1, 1974.

India and Nepal: Emphasis on architecture and museums—January 22-February 15, 1974.

Sites of Civilization Cruise: On the spacious yacht *Argonaut,* chartered especially for Smithsonian Associates, join some of the world's great scholars who lead the cruise. From Rome to Athens, via Sicily, Malta, Tunisia, Egypt, Thera and Cyprus—April 6-27, 1974.

Greece: Sites and flowers in northern Greece and the Peloponnesus—April 27-May 12, 1974.

Ethiopia and Kenya: Ancient and contemporary cultures from Aksum to Lalibela, plus several days in Kenya—May 24-June 14, 1974.

Afghanistan and Pakistan: Archaeological and historical sites—October 21-November 11, 1974.

For detailed information on Foreign Tours, write Miss Bliss Schumann, Room SI 123; for Domestic Tour information, write Mrs. Patricia Kilkenny, Room SI 106, both at Smithsonian Institution, Washington, D.C. 20560.

"Life on an Oceanic Rock" is the first in a series of illustrated lectures cosponsored by the Smithsonian and the Audubon Naturalist Society. This first lecture features Carl Buchheister on Monday, October 15, at 5:30 P.M.

"The Women's Movement" will be examined by eight distinguished women including Betty Friedan, Jane O'Reilly and Congresswomen Shirley Chisholm and Martha Griffiths in a series of lectures, beginning October 4 at 8:00 P.M.

Smithsonian Commons
Luncheon facilities for members of the Smithsonian Associates are in the original Smithsonian Building. Open Monday through Friday from 11:30 A.M. to 2 P.M., the Commons offers a buffet luncheon from $1.40 to $1.85. Also for the Associates a continental breakfast of coffee and pastries is offered from 10 A.M. to 11 A.M. and afternoon tea and pastries between 2:30 and 4:30 P.M.

Renwick Gallery
"American Glass Now" is an exhibition of contemporary U.S. glass sculpture, chosen from many entries—opens October 12.

Museum of Natural History
"Orchids" is a collection of 25 orchid paintings by the British botanical artist James F. Walford—opens October 1.

National Collection of Fine Arts
"The 23rd National Exhibition of Prints" consists of 73 graphic works chosen from more than 400 prints entered by artists throughout the United States. NCFA, in conjunction with the Library of Congress, sponsored this competition.

"The Spanish Connection" is a selection of 50 black-and-white and color prints from NCFA workshops held in Madrid and Barcelona—opens October 19.

Traveling Exhibition Service
There are up to 70 different Smithsonian-sponsored exhibitions on display each month throughout the United States and Canada. For a complete listing and information on how to bring an exhibit to your area, write: Traveling Exhibition Service, Smithsonian Institution, Washington, D.C. 20560.

• Calgary, Alberta—"London and Bir-

mingham Railway Drawings" (Centennial Planetarium, Oct. 20-Nov. 18).
- Washington, D.C.—"Kurt Kranz" (Corcoran Gallery of Art, Oct. 5-Nov. 6).
- Mt. Vernon, Iowa—"Eskimo Art" (Cornell College, Oct. 13-Nov. 11).
- Minneapolis, Minn.—"The Huddinge Hospital" (American Swedish Institute, Oct. 20-Nov. 18).
- Poughkeepsie, N.Y.—"Children in Bondage" (Vassar College, Oct. 6-Nov. 4).
- Battle Creek, Mich.—"Volcanoes and Volcanism" (Kingman Museum of Natural History, Oct. 15-Nov. 11).
- Midland, Tex.—"The Magnificent West" (Museum of the Southwest, Oct. 20-Nov. 18).
- Columbus, Ohio—"The Phenomenon of Peter Max (II) "(Huntington National Bank, open until Oct. 28).
- Blacksburg, Va.—"American Pieced Quilts (I)" (Virginia Polytechnic Institute, Oct. 13-Nov. 11).

Museum Reference Service

The Smithsonian Associates' Museum Reference Service is available to members traveling within the United States. Associates may write for a packet comprised of lists, by state, of many of our country's museums, galleries and historical sites. Brochures are included when available. Please specify the states in which you will be traveling. Allow at least three weeks for mailing. Write: Smithsonian Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560.

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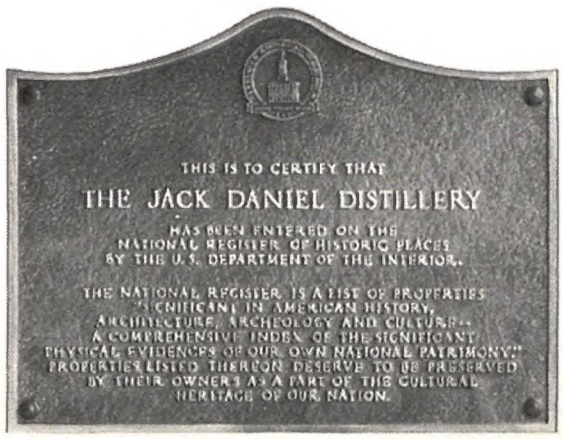
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By Patrick Ryan

Kindness may push daisies up from the rock

Ever since Eve tried on fig leaves, Man has been trying to speed up the pace of photosynthesis. To accelerate this process, by which green plants harness the energy of sunlight to build organic compounds from carbon dioxide and water, our ancestors have tried human sacrifices, magic, religious ceremonies, extraordinary dancing and symbolic love-making right down there in the loam. And in today's more scientific times, avant-gardeners seeking lush growth are investigating the effects of music, sweet talk and gentle fingers.

A few years back, *Time* reported that an Illinois farmer claimed he had increased his corn harvest by serenading the crop with Gershwin's "Rhapsody in Blue." An Indian botanist reported that electric bells encouraged seed germination and classical Indian violin and flute pieces speeded up growth. An Australian banana producer proclaimed that he obtained bigger and better bunches by setting up loudspeakers and bombarding his trees with a continual bass note. Finally, controlled laboratory experiments at the University of Ottawa established that exposure of winter wheat seedlings to continuous 5,000-cycle sound (comparable in loudness to concrete drilling) resulted in a two- to threefold weight increase, and just about a fourfold increase in the number of potential grain shoots.

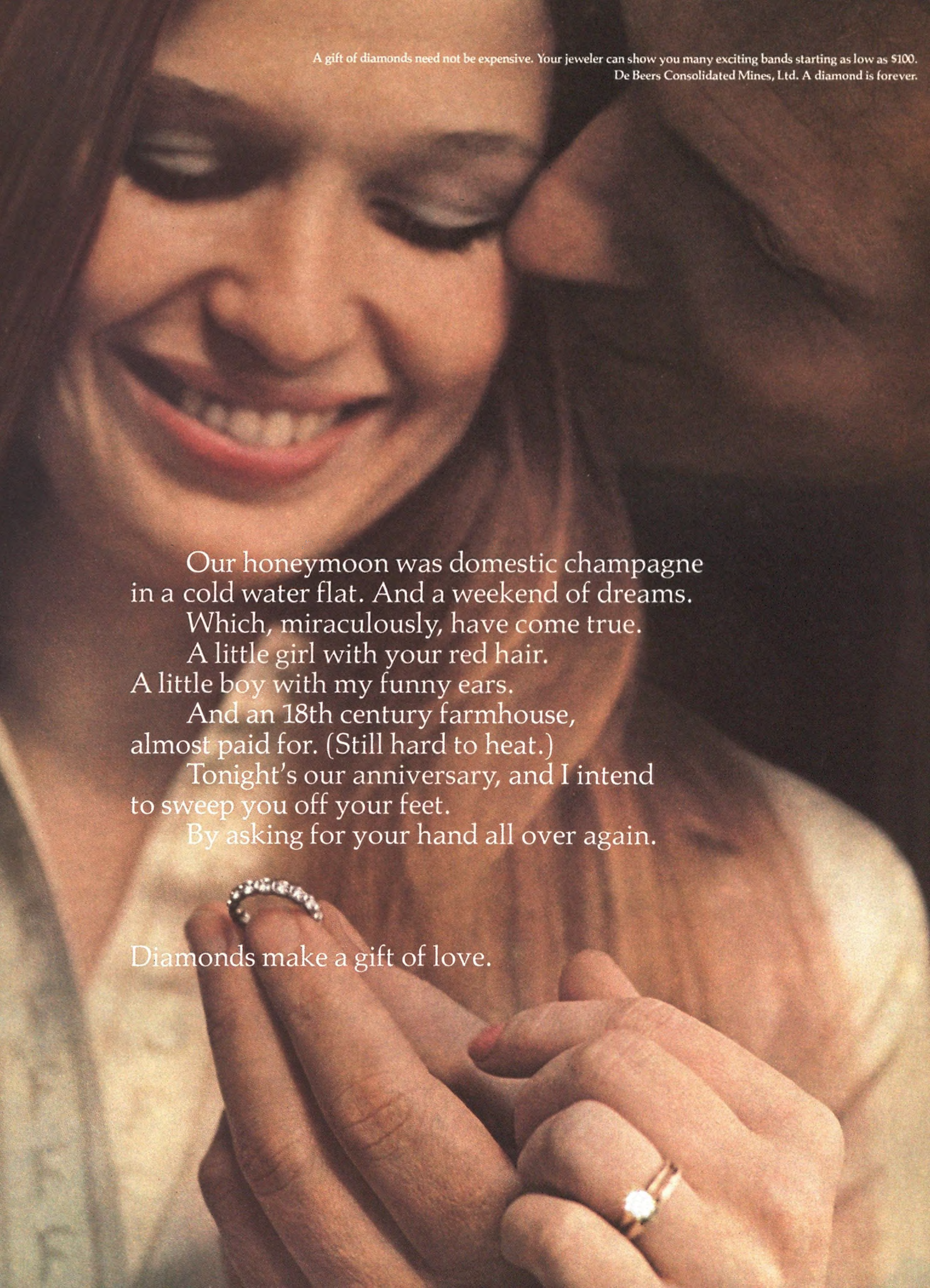
Rather than bothering with loud sound, many gardeners simply resort to sweet talk. There is notable support already on record for making conversation in the conservatory. While waiting for Maud to come into the garden, Tennyson extolled her beauty to the lily and confided the length and breadth of his passion to the rose. Alice-through-the-looking-glass had lively altercation with the flowers in the Red Queen's garden. The baritone lead in *Paint Your Wagon* confessed that "I talk to the trees, but they don't listen to me." And Julie Andrews and the tribe von Trapp chorally thanked the edelweiss for looking so happy to meet them and yodeled further encouragement for it to bloom and grow, bloom and grow forever.

The superstition that plants grow more readily for gardeners with green thumbs may have some scientific basis. Many years ago, Russian researchers Semyon and Valentina Kirlian developed special photographic apparatus which revealed unusual emanations from plants, normally invisible to the human eye. Films taken by American researchers, using similar techniques, have been interpreted to show that when gifted people touch an ailing leaf, a rosy-pink glow pervades and revives it. When others offer similar caress, "the glow around the plant fades to the point where it just about vanishes, the same effect we've recorded when a leaf dies," explained Dr. Thelma Moss, a UCLA medical psychologist who traveled to Russia to learn about the Kirlian technique. "I'm beginning to think that the green thumb or brown thumb effect is no myth at all," she added.

In being equipped to make deserts bloom, the green-fingered ones have apparently made treaties with all the myriad enemies of horticulture. The rest of us, on the other hand, are sought out mercilessly by every animate predator and bacterial murrain known to botany. Whatever green thing I plant in my garden is forthwith visited by so many blights, rusts and mildews that I sometimes check the basement to make sure I am not inadvertently holding the children of Israel in captivity. What stalwart foliage survives disease is subsequently set upon by caterpillars, slugs and vegetarian ants with built-in leaf shredders. If ever we get a good summer, I'll be standing by to repel locusts.

The few herbaceous veterans that make it through to adolescence are finally massacred by our feathered enemies. Despite scarecrows so horrific that my wife is afraid to take in the washing after dark, starving birds from every page of Roger Tory Peterson make regular meals in my backyard. The great auk would certainly be out there with the dodo, chomping away on my nevergreens, if both hadn't carelessly gone extinct.

Only the weeds—unplanted, untended, unwanted—flourish. Where once were visualized succulent vegetables and pretty flowers all in a row, I contemplate minor forests of giant bindweed, monster nettles and what look to me suspiciously like youthful chickweeds. And I sadly wonder why, oh why, those Kirlian photograph interpreters can't tell us how it is that these flower-fatal fingers which can blur the film or blight the cultured leaf, cannot equally wither away the weeds?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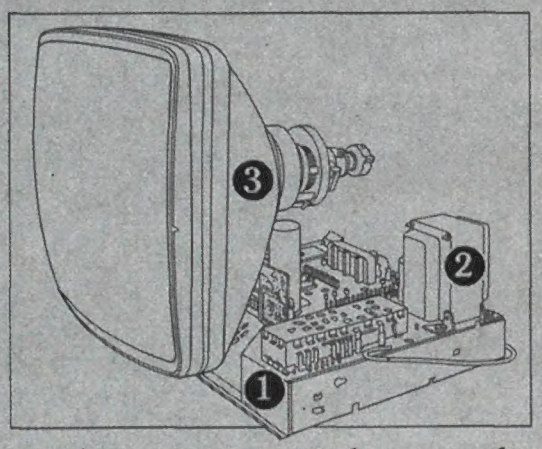
It's all new from chassis to picture tube. You get Zenith dependability and the best color picture we've ever brought you.

1. Zenith's 100% solid-state chassis. The most powerful chassis Zenith has ever built, for cleaner, more naturally brilliant colors. And Zenith solid-state design means years of dependable operation.

2. Unique voltage regulator to protect components. Another Zenith first. We call it Power Sentry. It guards your chassis and picture tube,



keeps your picture sharp under varying voltage conditions.

3. Advanced Chromacolor picture tube. The brightest picture tube in Zenith history. You get more contrast and detail than we've ever brought you before.

Zenith quality and dependability.* We're proud of our record of building dependable, quality products. But if it should ever happen that a Zenith doesn't live up to your expectations, we want to hear from you. Write to the Vice President, Consumer Affairs, Zenith Radio Corp., 1900 N. Austin Ave., Chicago, Ill. 60639.

At Zenith, *the quality goes in before the name goes on.*®

**In two recent nationwide surveys, independent TV service technicians named Zenith, more than any other brand, as the color TV needing fewest repairs. Survey details on request.*

Simulated TV picture.

ZENITH® SOLID STATE CHROMACOLOR® II